SHIP CALCULATION. RESISTANCE AND PROPULSION. See p. 388.
SIR NORMAN HILL ON SHIPPING IN WAR TIME. See p. 391.

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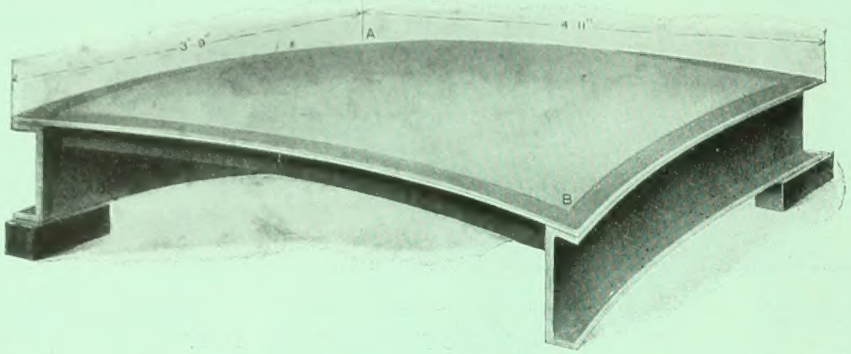


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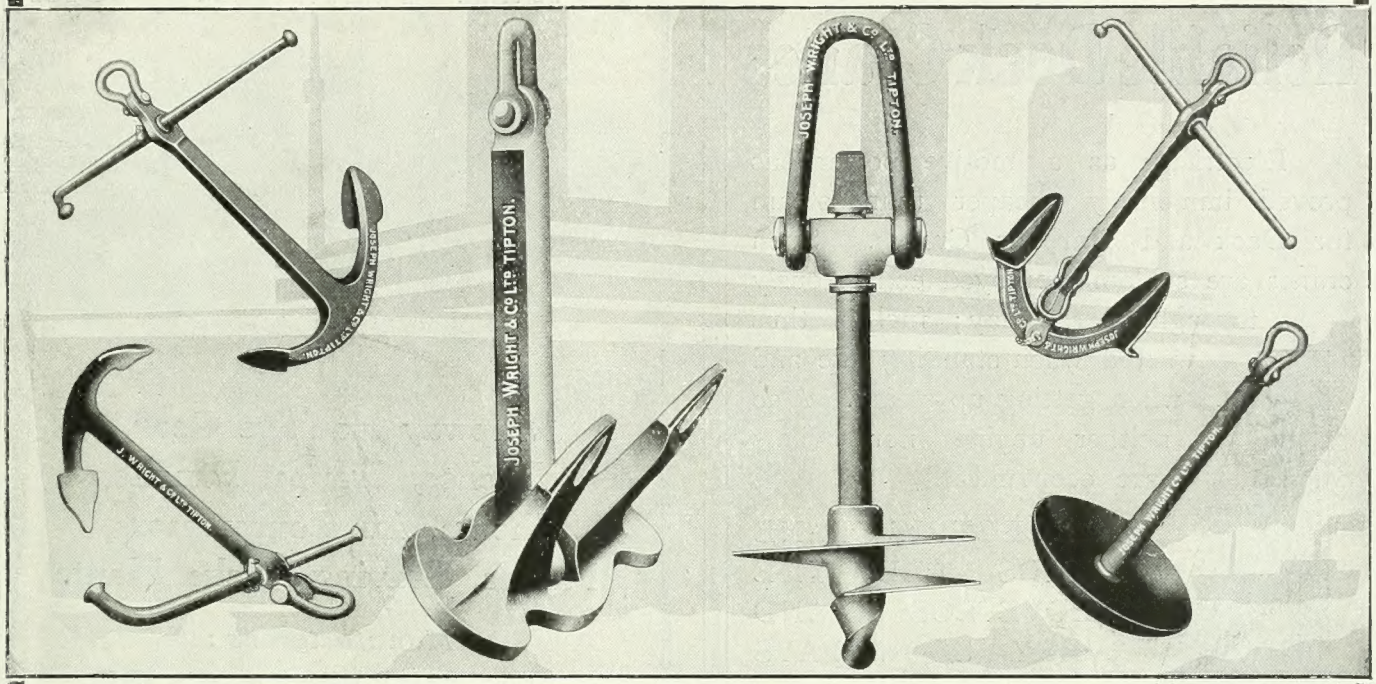


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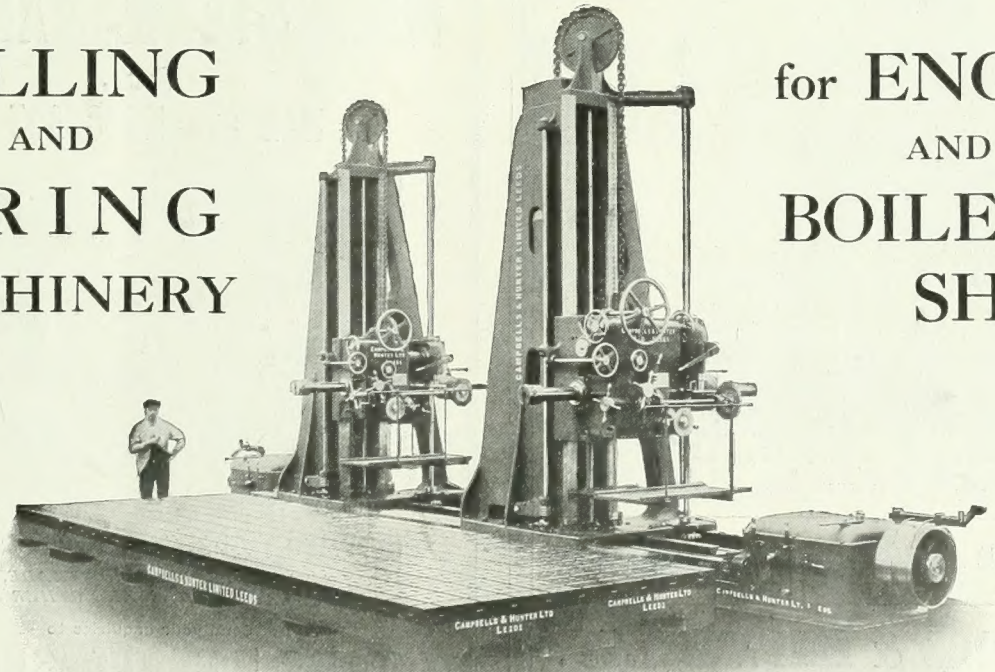

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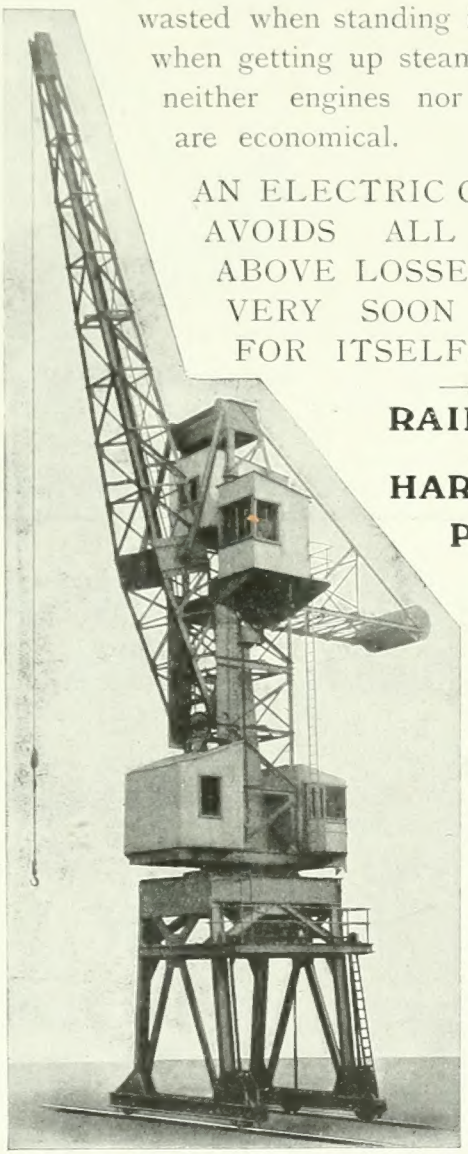

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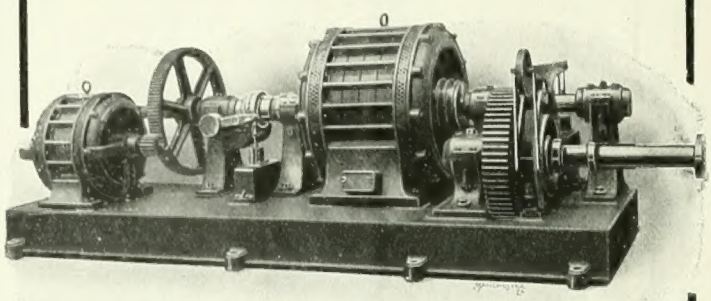

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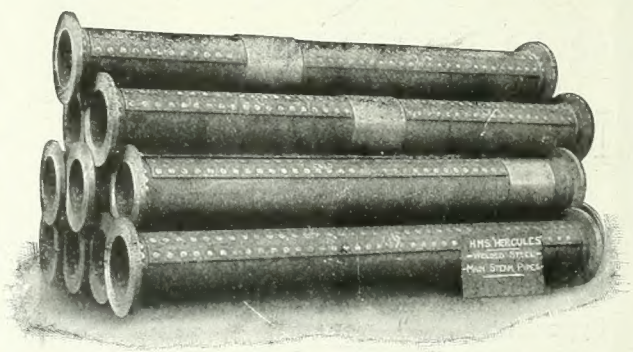

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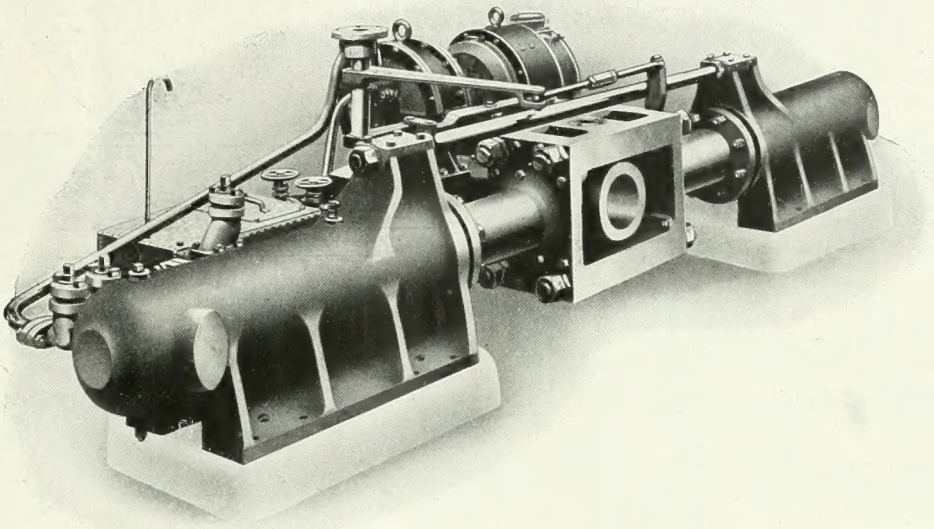

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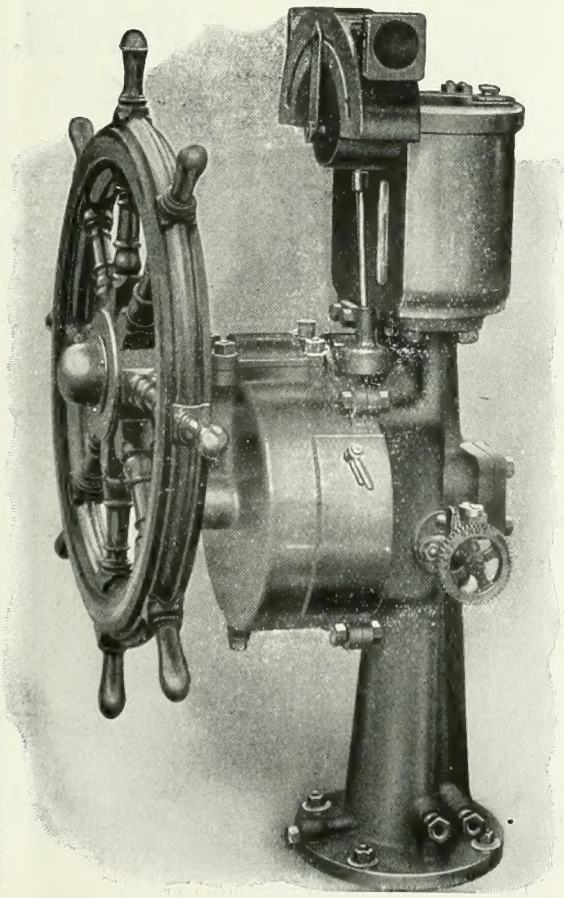

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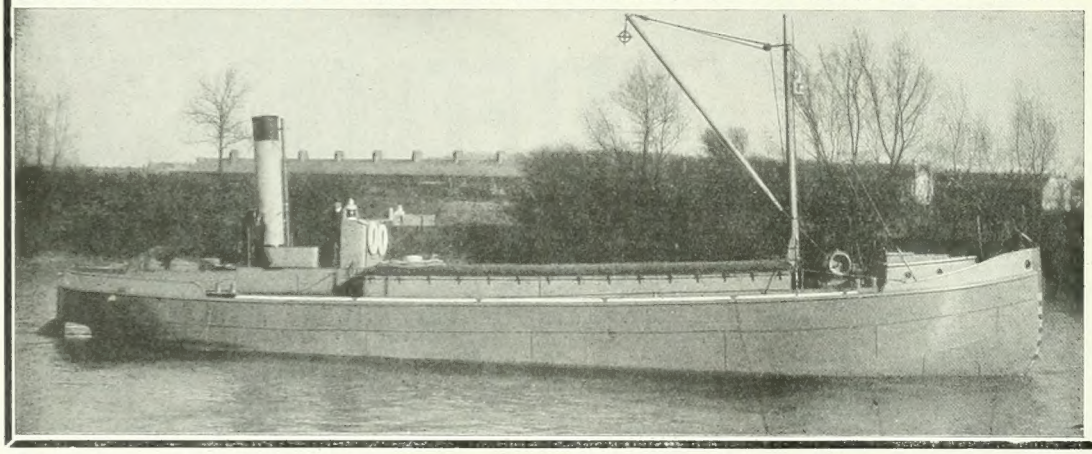

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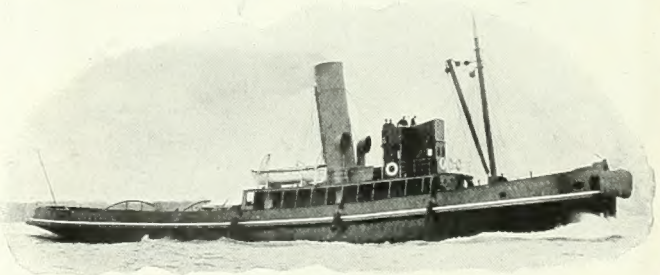

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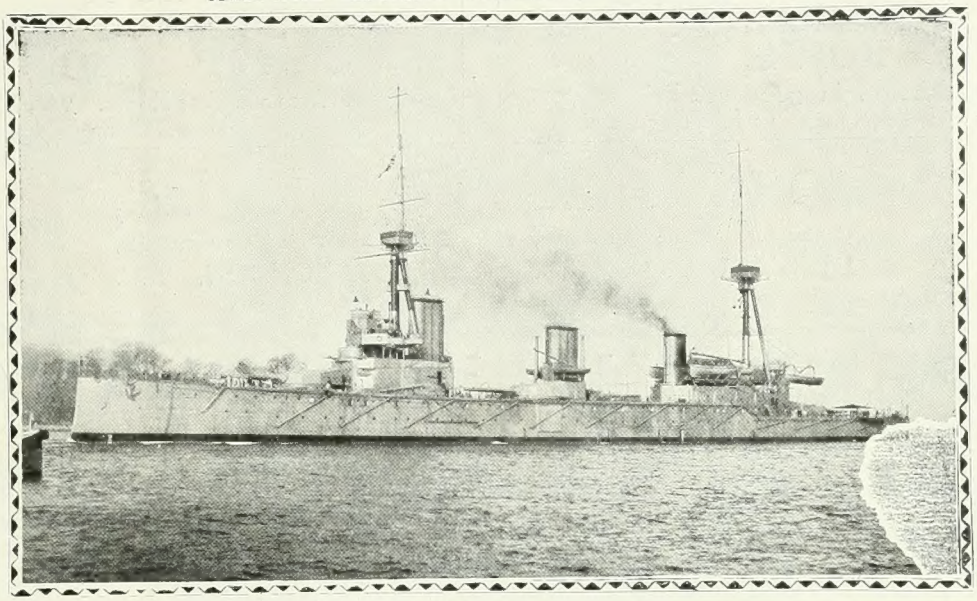

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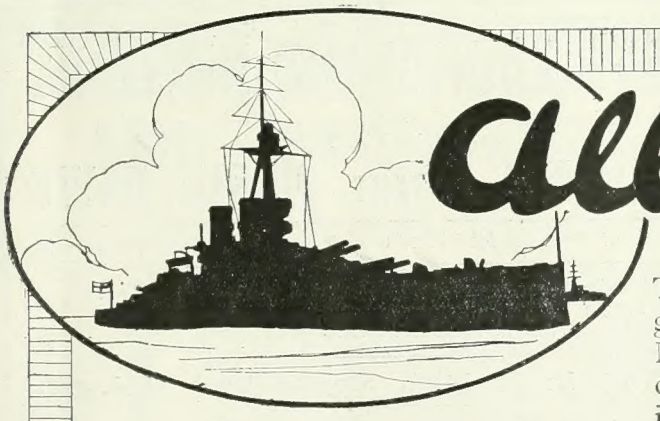

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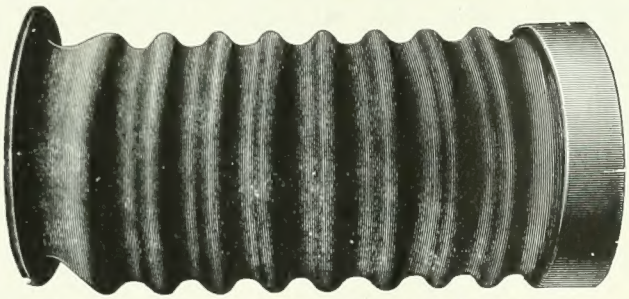

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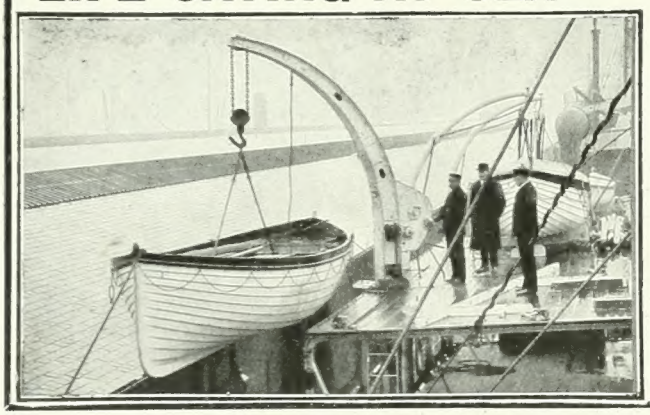

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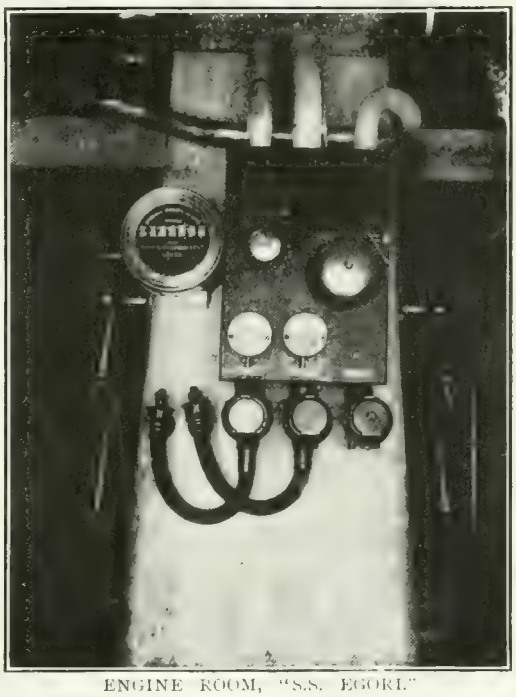

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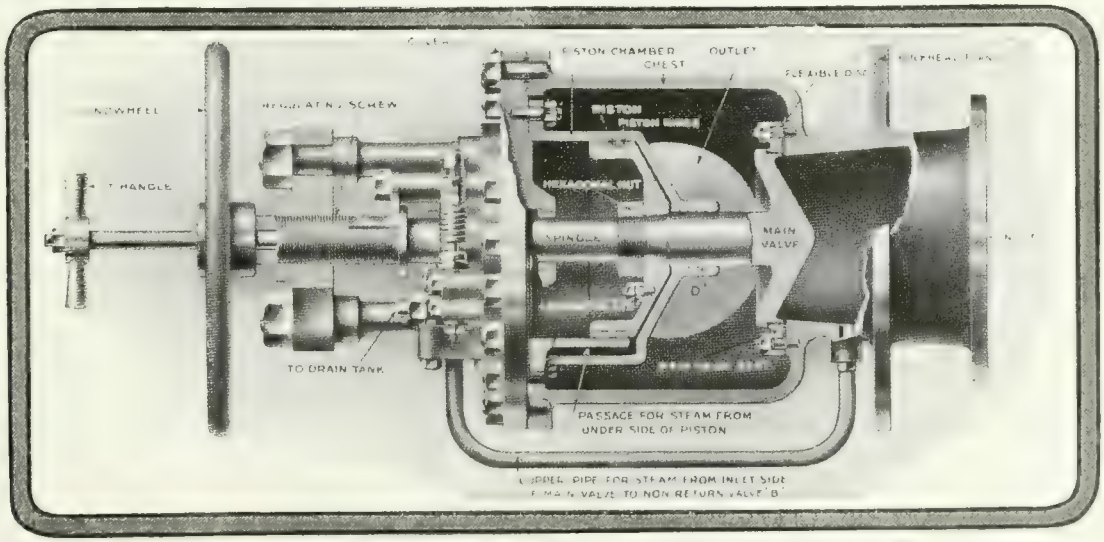


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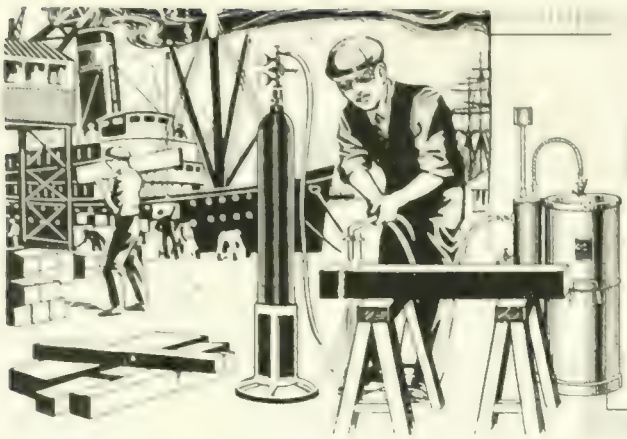

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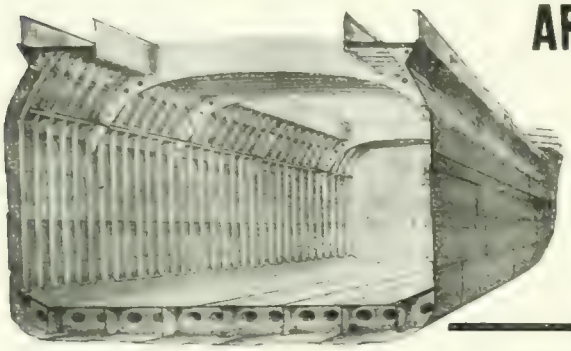

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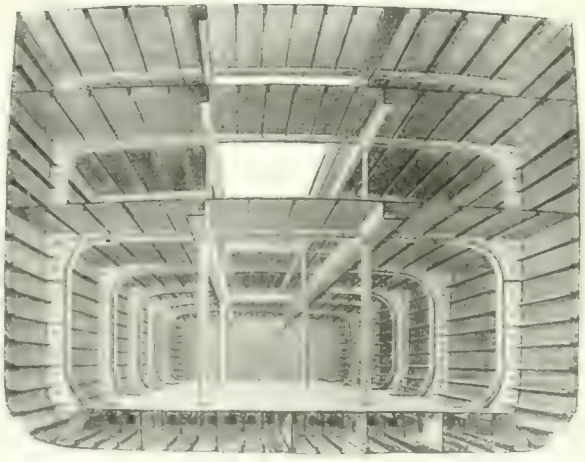

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THE exhaustive analysis of the effect of a year of war on our oversea ocean services which Sir Norman Hill has presented to the Liverpool Steam Ship Owners' Association, and which we publish in abstract on pages 391-92, reveals the fact that steamers whose aggregate carrying power during the year reaches the enormous total of ten million tons, have been removed from commerce either by Admiralty commandeering, enemy machinations or through being locked up in places like the Baltic and Black Seas. Most of the vessels, however, have been taken for Government use with little regard to the resultant disturbance of the balance of trade. The Government is now anxiously regarding the rises in freight rates which are themselves indications of a further shortage of vessels; but apart from the general effects of the trade upheaval which all nations are passing through, the position has been considerably aggravated by the fashion in which the Government has taken ships for naval or military requirements. Commandeering on an heroic scale can only result in chaos. Without suggesting that this stage has been reached, it is obvious that improper uses have been made of ships through imperfect knowledge of the proper functions of the various types of ships, and just as the War Office has learned that it cannot have skilled engineers in the field and making munitions of war at the same time, so must the Government learn that it cannot take merchantmen at random and hold them up unnecessarily without upsetting the regularity of services upon which the economical distribution of shipping depends. The prospect of yet another Government department interfering with a view to the adjustment of freight rates is not likely to be regarded with much complacency by shipowners who are already harassed by the uncertainties attaching the injudicious withdrawal of tonnage. We are afraid that, when the whole scheme is announced as has been promised, owners who are carrying on with difficulty a trade between neutral ports—a trade carefully fostered during peace time—will look with trepidation upon attempts to divert their ships to a fictitious application of "all British" interests. The effects of super-patriotism may easily, in the hands of misguided and ultra-zealous officials, deliver too much of our shipping prestige to those neutrals who are displaying an excessive eagerness to snatch away British mercantile supremacy. The suggestion for the insertion in all contracts of a clause providing that the owner may land a cargo anywhere should the Government forbid the voyage and yet receive full freight and other advantages as though the full voyage had been completed, is a very sweeping proposal which will have the effect in certain circumstances of relieving the Government of considerable responsibility and embarrassment. We can only express the hope that the collaboration with shipping interests has been, and will be, as real as is pretended, and that the advice of the best of our shipowners will really be embodied in the execution of the scheme and not merely piously tabulated for reference.

**The Shortage of Tonnage.**

Now that steamers are so precious, some owners are giving a bonus to their captains for running their vessels free of casualty. This is a proceeding that will meet with full approval from underwriters, and though in the past some have regarded a return for no claim being made on a policy with disfavour, yet in the event of a bonus to the captain being a factor there is no reason why such a return should not be allowed. It would but reimburse the owner for an expense which is admittedly of great benefit to the underwriters. A matter akin to the foregoing is that of instructions to captains. The owners of at least one large fleet of tramp steamers impress the captains of their vessels with the necessity of avoiding strandings. The result is that though the fleet has been in existence for a considerable number of years, it has never suffered a total loss, while its record from an underwriter's point of view is excellent.

**Returns and Bonuses.**

The assured who accepts a policy of insurance in which the rate is not mentioned, or in which the words, "Rate as agreed" are inserted, has only himself to blame if he is cheated. The broker who persuades his client to accept such a policy, is thereby enabled to pay one rate and charge another. He thus not only makes his brokerage and the difference between the two rates, but the brokerage amounts to a larger sum than it would if he gave his client the benefit of the cheaper insurance. The occurrence of this sharp practice is not frequent, but instances have brought the matter into prominence of late, while fluctuations in certain markets have made the practice one of easy accomplishment. There can be no possible reason, other than duplicity, for any ambiguous wording in a policy of insurance. The interest, rate, period, conditions and clauses should be stated with the utmost clarity, and wordings of an obscure nature should not be accepted.

**"Rate as Agreed."**

The contract for two new vessels which has been placed by the Cunard-Anchor Lines with A. Stephen & Sons, Ltd., Linthouse, is the most important mercantile order which has come to the Clyde for a considerable time. The new vessels will each be 520 ft. in length, which is smaller by about 20 ft. than either the *Tuscania* or the *Transylvania*, which were built on the Clyde recently for the same owners. Like these two vessels, however, the new ships will be fitted with geared turbines. The *Tuscania*, it may be mentioned, which was also built by Alex. Stephen

**New Cunard-Anchor Liners.**

& Sons, was the first geared turbine steamer which that firm constructed. The new vessels, which are intended for the Anchor Line's Eastern trade via the Suez Canal, will be larger than any of their steamers at present on that route, and they will also be larger than any of their North Atlantic liners trading between the Clyde and New York excepting, of course, the *Tuscania* and *Transylvania*, which were, however, originally intended for the Mediterranean-New York Service, but owing to the war were put on the service between this country and New York. The latest addition to the Anchor Line's Eastern fleet up till now is the *Elysia*, a vessel of 440 ft. in length, built at Meadowside in 1908. It would appear that by placing a contract for two large up-to-date vessels the Cunard-Anchor Combine anticipate a considerable development in trade between this country and India after the war is over.

**Conditional Contraband.**

In the quarterly report of the British Steamship Owners' Association particulars are given of a case in which the ss. *Wearbridge* was chartered to the Societa Anonima Navigazione Alta Italia to carry a general cargo consisting principally of cotton to Genoa. The cargo was shipped at Galveston, but it contained some food-stuffs. The charter provided that the cargo was to consist principally of cotton or other free goods. If grain or other conditional contraband were shipped, the same was to be consigned to neutrals, and no cargo was to be consigned to belligerents. There was also the usual war deviation clause attached. It was also clearly provided in the charter-party that no contraband was to be shipped, and if conditional contraband were shipped it was to be expressly consigned to neutrals. The vessel was stopped at Gibraltar, and part of the cargo which consisted of 1,200 sacks of flour, shipped by the Kelley Willing Company and consigned to order, was taken possession of and discharged by the Admiralty at Gibraltar. The ground of the seizure at Gibraltar was that the eventual destination of the cargo was Switzerland, and that it was consigned to order in Switzerland. The owners of the vessel suffered six days' detention owing to the confiscation of the flour at Gibraltar. They also incurred a considerable sum at Gibraltar in respect of disbursements, and sustained a loss of freight on the cargo confiscated by the Government. The matter was therefore placed in the hands of the Association's agent at Gibraltar who took immediate steps to protect the owners' interests, and eventually the owners recovered the claim in full, which was paid by the charterers' agents at Genoa.

**Freedom of the Seas.**

Freedom of the seas, in the mouth of Herr Ballin, is merely a phrase meant to impose on the uninstructed. When he exhorts neutrals to see in the British Fleet a menace to that freedom, we can only ask him to explain his words. What illegitimate step has the British fleet taken on the open seas? We know of none. It has observed international law. It is strong. It has for 15 months confined the German High Seas Fleet to its protected bases. It has swept the German commercial flag from every sea on the earth except the Baltic, and even there the German mercantile marine leads a transient and embarrassed existence. This is the condition of things which causes Herr Ballin to reproach us with menacing the freedom of the seas. It is, indeed, the result of the greatest application of sea power known to history. But in the ethics of naval warfare there is nothing unsanctioned in what we have done. Many Germans, and we have no doubt that Herr Ballin is one of them, take the view that the Orders in Council of March 11, which hold up the whole sea trade of Germany passing in neutral ships through neutral ports are a gross violation of international law. But they forget one cardinal determining factor. Those Orders in Council are not conceived by us as a permanent precedent in maritime warfare. They are only the counter-stroke to one of the most diabolical declarations of policy ever enunciated by the naval representatives of a Power which claimed to be civilised. We mean the German submarine blockade. That callous adventure, an intentional violation of the freedom of the seas if anything is, has dashed itself into sporadic and precarious action, but we do not see what ground any German has to complain of the legal illegitimacy of the great retaliatory measure of the Orders in Council.

**Applied Science.**

In his presidential address at the meeting of the North-East Coast Institution of Engineers and Shipbuilders last Friday, Mr. Herbert B. Rowell, Managing Director and Naval Architect of the shipbuilding department of R. & W. Hawthorn, Leslie & Co., Ltd., drew particular attention to the necessity of our technical colleges instilling into their pupils a proper regard for questions of cost in addition to the acquisition of technical knowledge. In pointing out the other disadvantage under which some graduates suffer of having specialised at too early a stage of their training, he said "Knowledge is not an asset until it is applied." It is in the application of his knowledge that the scientific man so often comes to grief—the failure to appreciate the commercial value of learning as distinct from its appraisement in the examination room. The proper appreciation of this factor would save many heartburnings of young students and would enable them in good time to learn the lesson that even high scholastic attainments have a commercial value directly proportional to the application of the knowledge to the benefit of industry. The industries of shipbuilding and engineering, more than any others, show how this rare combination of science with commercial instinct raises a man much above the level of those who too often regard their knowledge *ipso facto* as an entry to the best positions.

**The Diesel Engine Position.**

When certain firms in Denmark, Holland and Germany began to make headway with developments of the Diesel engine for the propulsion of ocean-going vessels, it was said here by some people that British shipbuilders and marine engineers were singularly lacking in enterprise. By the time we got into our stride with the machine the foreigners indicated would be, it was asserted, far ahead of us. Admittedly, that was how the position looked to the average man who could not be expected to know that the matter was closely engaging the attention of several British firms. During these days of war it has not been possible to do a great deal experimentally. Still, something is being done, especially with two-cycle engines, and for results of it we should not have long to wait when peace is restored to the world. From other evidence, it is also clear that we are not so far behind our Continental rivals as we are alleged to be. A Norwegian concern has joined up with the Nordstjernan Line in its service to the West Coast of South America by the Panama Canal route. The Swedish company uses motor ships in this service, and the Norwegian concern proposed to order two similar vessels. It found, however, on circulating its inquiry that Continental Diesel makers were full of work and could not undertake any more. Now, we know fairly well how many motor vessels are on order. The progress is gratifying, but the total is not large. The conclusion the average man will draw from the facts is, we think, that there is really nothing to choose between Continental and British Diesel engine manufacturing resources.

**The Man and the Act.**

The persistence with which some members of the Amalgamated Society of Engineers misinterpret certain provisions of the Munitions Act is astonishing enough to suggest that many men do not wish to read it aright. One of the 60 candidates for the two assistant general Secretaryships recently created by the delegate meeting asserts, for instance, in his election address that "in return for the abrogation of our rules and the sacrifice of our right to strike we have obtained absolutely nothing except the promises

of Pecksniffian politicians of the Lloyd George breed that when the war is over we shall resume a pre-war position." That is, of course, not true. The obligation on employers to revert to pre-war conditions of employment is statutory, as everybody who has read the Act must know. Another candidate alleges that the employers are guaranteed one-fifth additional profits, while the workmen are guaranteed nothing although the necessaries of life have increased in cost "to the tune of 35 per cent." What the increase in the workmen's cost of living actually is, we do not know. But it is clear that in making his point this candidate misapprehends what has been done. In controlled establishments profits are limited to the average of the two years immediately preceding the war plus a fifth. A fifth is 20 per cent, and 20 per cent. is, broadly speaking, the amount of the war bonuses which the Committee on Production have awarded practically all the trades which have had references before it. The truth is that employers are as adversely affected by the Munitions Act as are the men, and as they had nothing to do with its framing, and the men had, they have greater cause to grumble. Yet they have not publicly uttered a word of protest, while the men are more or less always protesting.

**Dredging Records.**

Last week we noted some records which had been made in dredging the obstructions in the Panama Canal. As the work proceeds new records are being established. For instance, in the 24 hours ending at 6 p.m., October 5, the 15-yard dipper dredger *Paraiso* established a new high record for a day by turning out 17,185 cubic yards. This was an average of 5,728⅓ cubic yards by each of the three shifts, and at the rate of 716 cubic yards an hour. On September 6 the *Gamboa* made a run of 12,545 cubic yards, which surpassed anything done on the Isthmus before that time in hard material. Later the *Gamboa* made a record of 15,145 cubic yards, while the *Paraiso* set a high mark, at 14,650. And on October 4 the *Paraiso* went as high as 17,185. The latest record is greater by 4,640 cubic yards than that of a month ago. It represents an output 37 per cent. greater. In the month of September the dredging fleet excavated 1,052,586 cubic yards from the Cut, setting a new high record for its work in that section. In addition, 63,066 cubic yards were re-handled. In August the excavation from the Cut amounted to 991,879 cubic yards; in July, to 692,109, of which 193,938 cubic yards were earth.

**Cruiser Sterns and Speed.**

The cruiser stern has apparently come to stay, and although a great deal of controversy has taken place in regard to it, it is generally admitted that it does possess many advantages. It may be taken that the chief benefit that it gives to a ship is a gain in speed for no increase of power, or a reduction in power for the same speed as compared with a vessel with an ordinary stern. This gain in speed is often spoken of in a general sort of way, and actual figures have not appeared until recently. In a paper read before the Liverpool Engineering Society early this year, Mr. A. T. Wall pointed out that in a Channel steamer 350 ft. long it was possible to get half a knot more speed by fitting a cruiser stern. Quite recently, Mr. G. S. Baker has referred to the same matter in his book on "Ship Form, Resistance and Propulsion." He states that with a cruiser stern properly worked into the ship a reduction of power from 10 to 15 per cent. is possible. The lower percentage given would represent a gain of about half a knot in the ship referred to above, and, of course, slightly more for the higher figure. The greater the speed of a ship in proportion to her length, the greater will be the ratio of the wave-making resistance to the total. The cruiser stern only effects a saving in the residuary resistance, and in consequence cruiser sterns should be fitted to all high-speed vessels if only for this reason, which incidentally helps to explain their presence in all vessels of war. We may expect in the future to see a wider adoption of this type of stern.

**Form and Subdivision.**

During some recent work on a proposed vessel, the writer was up against the difficulty of having too short a compartment for the engine room. With the form proposed, the new subdivision rules made only a certain length possible, and this was less than that required by the engineers for the power to be installed. An increase in the freeboard ratio would have overcome the difficulty, but this would have meant either an increase in depth to bulkhead deck with an accompanying increase in beam, or a decrease in the limiting draught. Neither of these solutions commended themselves. In this case it was found possible to obtain the proper length by alteration in form. It can readily be seen, that as the sections in way of the engine room in the original form were very full, the flooding of a certain length would bring the vessel down to the margin line sooner than if these sections had been finer. The form of the ship in way of the engine room was accordingly altered, the sections were made finer, and a greater floodable length was obtained. It is probable that only in very special cases will difficulties of this kind be met with, but the fact that even the forms of ships might become subservient to the subdivision problem was scarcely anticipated. As the result of some experiences with the new regulations, the writer is of the opinion that the greatest difficulties will be met with in the subdivision of very large ships, and in fast cross-Channel steamers, and the machinery spaces will be difficult to properly subdivide in these types. Doubtless satisfactory solutions will be found for these difficulties as they arise.

**Condenser Ferrules.**

In the United States Navy, and probably in others as well, fibre has been extensively used for condenser ferrules and with varying reports of success. Some claim the very best results and others disastrous ones. It is believed that in the latter case the result is due to the fact that the ferrules are not of the right size to begin with. It has been found from experience that the annular spaces around the condenser tubes vary considerably, depending on where the condensers were made. It is also found that in an old condenser where the threads have been re-tapped there is great irregularity, and difficulty has been experienced in tightening the tubes with tools that worked well with the ordinary annular space. If the fibre is ordered to a size to just fill this annular space it will then swell after being set up and wet to about 30 per cent. if free, so that it would entirely fill diametrically the space and make a tight joint, while the gland simply does the same at the end. If the ferrule is quite small so that it cannot soak enough moisture to swell diametrically and entirely fill the space, the end pressure of the gland cannot accomplish the desired result and make it swell throughout its length diametrically. The gland may make a tight fit in its proximity, but the whole length cannot ever be forced by the gland to the proper width. Therefore, as is pointed out by the author of an article entitled "Inspection Notes," which appears in the Journal of the American Society of Naval Engineers, it is advisable for those using these ferrules to see that they are a fairly tight fit when dry. Any size may be ordered and made with extreme accuracy, but the ordinary stock ferrule may not fit all spaces.

**Efficiency and Slip.**

In a paper read before the Institution of Engineers and Shipbuilders in Scotland last week by Mr. James Dornan, some alternative types of machinery for a 19¼-knot vessel were discussed. The paper was full of interesting matter. One suggestion in it seems, however, to go against all previous experience and judgment. Mr. Dornan said:—"With a view to securing further economy in turbine-driven ships it is recommended to increase the propeller revolutions to such speeds as would produce slip ratios of from 45 to 50 per cent., provided always that the disc area ratios of the propellers does not exceed ·7. The net effect will be to

produce machinery which will be small and light, and also decrease the steam consumption," &c. It will generally be admitted that the aim of engineers ever since the introduction of turbine machinery has been to have the turbines running at the highest possible revolutions compatible with reasonable propeller efficiency. Certain loss in efficiency of propellers is obtained with high revolutions, but the higher the revolutions the better from the turbine point of view. It is reasonable to suppose that the revolutions of existing direct turbine-driven ships have been determined from considerations of the different factors in the problem, and that the best compromise has been effected. Sir Charles Parsons has said that it has generally been found that 20 to 24 per cent. apparent slip ratio at the speed of the *Lusitania* gave about the best results. If the size of the propellers is diminished too much then the efficiency drops very suddenly and the results are very disappointing. Increasing the slip to 45 or 50 per cent., as suggested by Mr. Dorman, would of necessity mean the adoption of propellers of small diameter and the loss in efficiency of which Sir Charles Parsons spoke would be considerable.

## A CLEARING HOUSE FOR LLOYD'S.

THE delay in getting policies signed at Lloyd's which was complained of in our editorial notes some weeks ago has called into being a scheme which has received the approval of the underwriters' associations and which, subject to certain contingencies, it is hoped will soon be in operation. The trouble in the past has been that a policy had to be deposited with each syndicate of underwriters on the slip in turn. This process involved a large number of separate transactions, perhaps fifty or more in the case of a long slip *i.e.*, a slip with a large number of initials on it.

The enormous increase of business together with the absence of a large number of underwriters' clerks on military duties resulted in a grave state of congestion. Complaints were frequent and it became obvious that some method must be devised to combat the avalanche of policies which daily descended at a busy underwriters' box. To this end a scheme has been worked out in detail which it is hoped will do much to solve the difficulties under which underwriting staffs have been labouring for some time past, and at the same time enable owners to obtain their policies with the least possible delay. The process will be that of a Clearing House; an office in or near Lloyd's will be equipped with the necessary staff and material. Here the policies will be deposited by the brokers, to be scrutinised by a staff of experts, who having satisfied themselves that the policy is in accordance with the terms of the slip, will hand the documents to a clerical staff who will note the details necessary for each syndicate. This information will be eventually handed to the underwriter who will then be in the same position as if he had the slip before him. From these details he will then post his voyage book, journal, &c., secure in the knowledge that the policy has been subjected to careful examination before being signed. The actual impression of the rubber stamps together with the filling in of the amounts and signature against each syndicate will be done in one operation by the clerical staff of the bureau, and it is estimated that a policy deposited in the morning will be ready for delivery on the afternoon of the same day. This compared with the weeks now occupied by the present method is an unanswerable argument in favour of the new proposal, but the benefits of the scheme are many and obvious. Errors that have been passed by the signing clerk who first deals with a policy are often allowed to remain undetected by the subsequent signatories who, relying on the examination of the leader, sign the policy without scrutiny. The risk of a policy being lost or mislaid will also be greatly lessened, though it is true that loss is an extremely rare occurrence even in these days of stress, but instances of documents being mislaid and only being brought to light after a prolonged search are not infrequent. A tremendous amount of time will be saved by the new scheme, and a large staff hitherto engaged on signing policies will be set free to deal with more important work, while in some cases it will mean more recruits for Lord Derby. Another favourable detail that may be placed to the credit of the new scheme is that the policies should come from the Clearing House clean and whole. Now a policy acquires a large amount of grime during its wanderings in the Room, while hasty openings and refoldings sometimes result in rents that have to be patched with unsightly strips of paper pasted over them.

The scheme is admittedly one of emergency, evolved in order to deal with our abnormal condition of things arising from the war, but should it come into practice and prove to be all that is hoped, there is no reason why it should not become a permanency.

## ENEMY INTERESTS IN SHIPS.

WE recorded last week that in future British Prize Courts would discard Article 57 of the Declaration of London in favour of the old rules and principles of the British prize law in determining the nationality of vessels. Those rules and principles, we then indicated, permit the Courts to go behind the actual flag flown, and to examine whether in fact an enemy ownership in part or in whole did not exist. We do not know the extent of tonnage to which the Courts will be invited to apply the old rules and principles, but we would point out that since they were developed a profound change has come over the ownership of vessels in consequence of the ramifications of the joint-stock system of finance. The proprietary interests in a modern joint-stock corporation or limited liability company are most elusive. We have already had instances in the Law Courts of the manner in which enemy interests are entrenched behind our company law. We should like to know whether in the Prize Court, joint-stock arrangements are to be allowed to disguise virtual enemy ownership of vessels behind a neutral or an allied flag. The principle laid down in the Merchant Shipping Act is that a British ship may only be owned by a British subject or a British corporation. British company law is very lax in the facilities which it gives to aliens to constitute themselves into a British corporation. They have not been slow to avail themselves of the expedients. The result is that, to-day, there are not only friendly neutrals owning British tonnage and flying the British flag but there are also British vessels which are practically entirely owned by enemies. What we want to know is whether the rules and principles of the old prize law are going to take cognisance of these enemy interests.

## SHIP CALCULATION, RESISTANCE AND PROPULSION.

DURING the International Engineering Congress held in San Francisco in September, Rear-Admiral D. W. Taylor, Chief Constructor of the United States Navy, gave a most interesting and instructive paper on the above subject. It is possible to refer to only a few of the points discussed. Several years ago he read a paper before the American Society of Naval Architects and Marine Engineers on a method of determining the lines of ships by formula. For some 15 years this has been in use at the United States model basin at Washington, not with the idea that they give lines of minimum resistance, but simply to obtain lines possessing desired shapes. The main features of the forms of ships can be expressed mathematically, and these features can be reproduced in new vessels of different dimensions. By the application of this method considerable time is saved at the Washington tank, where they deal with as many as 150 distinct models in one year. Practically all United States naval vessels designed during the last 10 years have had mathematical lines.

Although it is more than 40 years since Froude built the first model tank in his garden at Torquay, it is only since a comparatively recent date that model tanks and their results have been generally

accepted as ordinary tools of the naval architect, thoroughly to be relied upon. Here and there a sceptic may exist to-day, but the law of comparison as applied by Froude is now generally accepted. At the United States model basin, during the last 15 years, the Froude methods have been applied to the models of some 189 United States vessels, having a total value of £95,000,000. In the cases of two vessels only have the results of the trial of the full-sized ship differed materially from what was to be expected from the model results. These were sister ships with exceptionally full sterns due to which eddies were formed under the quarters with accompanying increase in resistance, which corresponding eddies did not appear in the model.

With regard to a frictional resitance, Rear-Admiral Taylor had some interesting things to say. The frictional resistance is determined from estimates made by Froude 40 years ago. It is very difficult to determine with minute accuracy the actual frictional resistance of a large vessel, the workmanship, condition of plating, and other minor factors affect it appreciably, and marine growth may increase friction radically. Experiments made with plates exposed to fouling, indicated that in seven months, a marine growth by no means excessive, would increase the frictional resistance by as much as 210 per cent.

In connection with the friction of models as regards variation with temperature, it was planned to run a model of a battleship and one of a torpedo boat, monthly, and note temperature upon each occasion. Sir Archibald Denny has stated that the correction should be 4 per cent. for 10° Fahr., whilst Mr. Baker corrects the results obtained at the Teddington tank by 3 per cent. for the same range of temperature, but only on the skin friction portion of the resistance. With change of water temperature there was a perceptible change in the resistance of both the battleship and destroyer models. For the battleship model, the decrease in resistance for 10° Fahr. increase in temperature was about 1·9 per cent. of the frictional resistance, and for the destroyer model 2·3 per cent. of the frictional resistance. This variation is less than that obtained in the British tanks, but the difference may be explained by the fact that wood models were used in the one case and wax in the others, and by the different qualities of the waters.

Rear-Admiral Taylor declares that the results of model experiments have been rather discouraging to the development of any formula for expressing the resistance of a ship. A factor which may be of importance at one speed is almost negligible at another. If two vessels are taken, identical in dimensions and displacement, and one built with fine ends and the other with full ends, the fine-ended vessel will offer much less resistance over a certain range of speeds, while at extreme speeds the full-ended vessel will be materially better. Attempts to devise a formula which would accurately express the plotted results of the standard series contained in Taylor's book, "The Speed and Power of Ships," have not been very successful.

The displacement of a ship is the primary factor in its resistance, land the proportions have a determining influence. Viewing the latter aspect, the most important feature is the length used for a given displacement; beam and draught are comparatively minor factors. Length is of peculiar value for cutting down the wave-making resistance, hence for fast vessels, where wave-making resistance is of such importance the total resistance may nearly always be decreased by increasing the length. A very important factor is the prismatic or longitudinal coefficient. For speeds up to $\cdot 8 \frac{V}{\sqrt{L}}$, the large midship section and fine ends are nearly always favourable to speed. About a speed length ratio of ·95 variation in prismatic coefficient does not produce much effect. For high speeds, however, above, say, $1 \cdot 23 \frac{V}{\sqrt{L}}$, a reduction in resistance is obtained by using full longitudinal coefficients.

The fore body has greater influence upon the resistance than the after body, and there is no doubt that fine or hollow lines forward near the surface, are favourable to speed. Many sea-going people and naval architects are opposed to hollow waterlines forward, but there are indications that the results of model tank experiments are making more and more impression upon practical people.

## ENGINEERS, ELECTRICITY, AND THE WAR.

At the opening meeting of the current session of the Institution of Engineers and Shipbuilders in Scotland, held in Glasgow recently, Mr. W. W. Lackie, the new President, took as the subject of his inaugural address the place of engineers in war time. Mr. Lackie is electrical engineer of Glasgow Corporation, and he not unnaturally laid stress on the important *rôle* played by electrical engineers. He considered that the engineers of the future, whatever else they might be, must have a sound knowledge of electrical engineering; and in the days to come they would either be all electrical engineers, or the electrical engineer, as such, would have ceased to exist. It was certainly true that during the past 18 years the electrical industry had shown rapid and consistent development. Perhaps none of the larger industries had grown to a similar extent in so short a time. So rapid did the development of the application of electrical energy continue to be, even now, that the expert must be constantly dipping into the latest technical literature if he was to keep himself abreast of his subject. It was a matter of the profoundest regret to them as engineers that the present war should have taken place. They readily acknowledged the indebtedness of the scientific and engineering world to the great and important contributions which German engineers had made to engineering science. In spite of the apparent unanimity of the German people, it was, he thought, admitted that the war, in its origin, was the outcome of the business section of Germany being dominated and over-ruled by an autocratic and military caste. Diversity of opinion there might be as to the particular section of the German nation which was initially or mainly responsible for the series of events which led up to the war; but as the days had passed into weeks and months, and the world conflict had grown ever more intense in the scope of its operations, it had become more and more apparent that this war was an engineers' war. The Minister of Munitions had repeatedly stated that the great need was for more equipment. "This is an engineers' war," said Mr. Lloyd George, "and it would be lost or won in the efforts or shortcomings of the engineers." A Glasgow Member of Parliament, himself an engineer, had said, "Engineers can make or mar the nation's chances in this war. Their willing service under abnormal conditions would serve the former purpose; their insistence on normal workshop conditions under abnormal needs would conduce to the latter." Trench warfare was a branch of civil engineering. Great engineering skill was shown in the equipment of our artillery. The growing need and urgent call for high explosive shells directed their appeal to engineers. Dr. Barr, in his fascinating lecture to the same Institution in March last, gave the members some idea of the ingenuity and perfect workmanship required in the construction of range-finders. The efficiency of our shipbuilding had been tried as never before, and they had every reason to be proud of the way in which it was passing through the ordeal. Electrical engineering had done its part in the supply and the operation of searchlights, telegraphs, telephones, wireless telegraphy, and in the provision of appliances for the enlargement of the scope and beneficence of surgical and medical skill in military hospitals. In the Navy, electricity was everywhere present from stem to stern of every unit of whatever size or kind. He thought there could be little doubt that amidst the mass of calamity, the unspeakable wastage of human life, and the awful and frequent wanton and unnecessary destruction of the priceless products of human ingenuity and human labour, there would no doubt emerge from the war a sense of unity of purpose among engineers, combined with a demand for greater efficiency. The war would bring to them a fresh realisation of the possibilities and the

[illegible] of engineering experts in national service, and in order that these suggested developments might materialise at the earliest possible moment, he expressed the hope that from the Munitions and other similar committees, in which engineering interests were largely represented, there might be evolved a new National Engineering Committee which would see to it that never again would the British Empire be in the state of unpreparedness which was only now being rectified after fully 12 months of unprecedented carnage.

## SHIPPING AT THE PIRÆUS.

One of the most remarkable and striking phases in the development of Greece has been the steady expansion of the Greek mercantile marine within the last 20 years. The number of vessels comprising the merchant fleet of Greece at the end of 1903 was 210 steamers, with a combined tonnage of 202,140 tons, and at the end of 1914 it numbered 440 steamers with a tonnage of approximately 900,000 tons, viz.:—

| | Vessels. |
|---|---|
| Over 6,000 tons ... | 4 |
| ,, [illegible] ,, | 15 |
| ,, [illegible] ,, | 84 |
| ,, 2,000 ,, ... | 134 |
| Below 2,000 tons | 203 |

The increase in shipping freights since the South African war, says Mr. Consul Norcop in commenting on the trade of the Piræus during 1914, has contributed largely to the development of the Greek merchant shipping, and certainly has had an extraordinary influence on the economic, and particularly on the monetary, situation of the country.

According to statistics published by a Greek journal, from July, 1913, to December 31, 1914, 85 steamers of 219,450 gross tons were added to the Greek flag. The value of these steamers, which he reckons at an average of £8 per ton gross, amounts to £1,755,600, and the total value of the Greek mercantile marine amounts to about 170,000,000 fr. (£6,800,000). It is estimated that the earnings which the Greek mercantile marine will realise in 1915 as a result of the war will exceed £3,000,000. Three thousand eight hundred and nine steamers of 4,067,337 tons and 488 sailing vessels of 37,023 tons entered the port of the Piræus in 1914, of which 3,938 vessels of 3,513,450 tons discharged cargo and 359 vessels of 590,910 tons entered for bunkers, repairs or loading.

The comparative table given below of the British vessels calling at the Piræus during the last four years shows a decrease, as compared with 1913, of 1 vessel and an increase of 8,663 tons. These figures, however, are not conclusive, for 13 vessels of 23,297 tons entered this port for orders, being unable to proceed to their destination in the Black Sea owing to the outbreak of the war, so that the actual shipping trade of 1914 was 186 vessels of 366,195 tons:—

| | Vessels. | Tonnage. |
|---|---|---|
| 1911 ... ... ... | 220 | 417,736 |
| 1912 ... ... ... ... | 231 | 446,787 |
| 1913 ... ... ... | 264 | 380,829 |
| 1914 ... ... ... | 199 | 389,192 |

The British shipping at this port during 1912-14 may be analysed as follows:—

| | 1912. | 1913. | 1914. |
|---|---|---|---|
| Khedivial Line between Alexandria, Piræus and Constantinople | 101 | 104 | 78 |
| Johnston & Co. steamers from Belgium and United Kingdom to Black Sea | 33 | 23 | 27 |
| Vessels with coal ... ... ... ... ... ... | 45 | 49 | 49 |
| Westcott & Lawrence with general cargo | 7 | 5 | 6 |
| Bell's Orient Line ... ... ... ... ... ... | 12 | — | - |
| Vessels with general cargo ... ... ... ... | 13 | | 12 |
| ,, ,, tourists ... ... ... | 1 | 1 | 1 |
| ,, calling for bunker coal ... ... ... ... | 5 | 2 | 1 |
| ,, ,, ,, repairs ... ... ... | 3 | 2 | 5 |
| ,, with petroleum from United States ... ... | 1 | 2 | 2 |
| ,, ,, timber from Black Sea ... ... ... | 1 | | 1 |
| ,, ,, wheat from United States | 1 | 9 | 4 |
| ,, calling for orders ... ... ... ... ... | — | — | 13 |
| Total... ... ... ... | 231 | 200 | 199 |

## UNITED STATES SHIPBUILDING.

The Bureau of Navigation, Department of Commerce, reports 83 sailing, steam, and unrigged vessels of 14,301 gross tons built in the United States and officially numbered during the month of September, as follows:

| | Atlantic and Gulf. | | Pacific. | | Porto Rico. | | Great Lakes. | | Western Rivers. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Gross. | No. | Gross. | No. | Gross. | No. | Gross. | No. | Gross. | No. | Gross. |
| *Wood.* | | | | | | | | | | | | |
| Sailing | 6 | 403 | .. | .. | .. | ... | .. | ... | ... | ... | 6 | 403 |
| Steam | 20 | 573 | 11 | 295 | .. | ... | 2 | 22 | 4 | 97 | 37 | 987 |
| Unrigged | 22 | 5,167 | 2 | 57 | ... | .. | ... | ... | 9 | 144 | 33 | 5,368 |
| Total ... | 48 | 6,083 | 13 | 352 | ... | ... | 2 | 22 | 13 | 241 | 76 | 6,698 |
| *Metal.* | | | | | | | | | | | | |
| Sailing ... | ... | ... | ... | .. | ... | ... | ... | ... | ... | ... | ... | ... |
| Steam .. | 3 | 6,767 | .. | .. | .. | .. | 2 | 42 | ... | ... | 5 | 6,809 |
| Unrigged .. | 1 | 764 | ... | .. | .. | ... | ... | .. | 1 | 30 | 2 | 794 |
| Total ... | 4 | 7,531 | ... | ... | ... | ... | 2 | 42 | 1 | 30 | 7 | 7,603 |
| *Totals.* | | | | | | | | | | | | |
| Sailing ... | 6 | 403 | ... | ... | ... | ... | .. | ... | ... | .. | 6 | 403 |
| Steam ... | 23 | 7,340 | 11 | 295 | ... | ... | 4 | 64 | 4 | 97 | 42 | 7,796 |
| Unrigged ... | 23 | 5,871 | 2 | 57 | ... | ... | ... | ... | 10 | 174 | 35 | 6,102 |
| Grand total ... | 52 | 13,614 | 13 | 352 | ... | ... | 4 | 64 | 14 | 271 | 83 | 14,301 |

The largest steel steamers included in these figures are the *Franklin*, 5,266 tons, for the Coastwise Transportation Company, and the *Fort Lee*, 1,080 tons, for the W. & A. Fletcher Company. From other sources than construction five vessels (officially numbered in accordance with the Act of August 18, 1914) of 11,776 gross tons, were added to the merchant fleet.

316 sailing, steam and unrigged vessels of 46,276 gross tons were built in the United States and officially numbered during the three months ended September 30, 1915, and 283 sailing, steam and unrigged vessels of 56,510 gross tons for the corresponding period of 1914, as follows:—

Three Months ended September 30, 1915.

| | Atlantic and Gulf. | | Porto Rico. | | Pacific. | | Hawaii. | | Great Lakes. | | Western Rivers. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Gross. | No. | Gross. | No. | Gross. | No. | Gross. | No. | Gross. | No. | Gross. | No. | Gross. |
| *Wood.* | | | | | | | | | | | | | | |
| Sailing .. | 11 | 4,038 | 1 | 7 | ... | ... | ... | ... | ... | .. | .. | ... | 15 | 4,045 |
| Steam ... | 92 | 2,200 | .. | ... | 52 | 2,161 | 1 | 19 | 29 | 546 | 22 | 397 | 196 | 5,323 |
| Unrigged | 41 | 9,551 | ... | .. | 19 | 1,114 | . | ... | 6 | 654 | 12 | 161 | 78 | 11,480 |
| Total .. | 147 | 15,789 | 1 | 7 | 71 | 3,275 | 1 | 19 | 35 | 1,200 | 34 | 558 | 289 | 20,848 |
| *Metal.* | | | | | | | | | | | | | | |
| Sailing... ... | .. | .. | . | .. | | ... | | ... | ... | ... | . | .. | | ... |
| Steam ... ... | 10 | 15,863 | ... | | 1 | 222 | ... | ... | 6 | 7,513 | 5 | 147 | 22 | 23,745 |
| Unrigged | 3 | 1,646 | | .. | | ... | | ... | ... | ... | 2 | 37 | 5 | 1,683 |
| Total | 13 | 17,509 | | | 1 | 222 | . | ... | 6 | 7,513 | 7 | 184 | 27 | 25,428 |
| *Totals.* | | | | | | | | | | | | | | |
| Sailing... ... | 14 | 4,038 | 1 | 7 | . | ... | . | .. | .. | ... | .. | ... | 15 | 4,045 |
| Steam ... ... | 102 | 18,063 | | ... | | 2,383 | 1 | 19 | 35 | 8,059 | 27 | 741 | 218 | 29,068 |
| Unrigged .. | 44 | 11,197 | | ... | 19 | 1,114 | . | .. | 6 | 654 | 14 | 198 | 83 | 13,163 |
| Grand total . | 160 | 33,298 | 1 | 7 | 72 | 3,497 | 1 | 19 | 41 | 8,713 | 41 | 742 | 316 | 46,276 |
| Corresponding totals for 1914 | 141 | 43,898 | ... | . | 78 | 6,996 | . | ... | 53 | 4,835 | 31 | 781 | 283 | 56,510 |

## SHIPPING AND THE WAR.

### Sir Norman Hill Reviews the Effects of a Year of War on Our Oversea Trade.

Sir Norman Hill, Secretary to the Liverpool Steam Ship Owners' Association, has drawn up for that body a report on the shipping of the United Kingdom employed on ocean oversea trade and the effect of the war thereon. It supplements and amplifies considerably the report which he presented to the Association last July, and brings up to the end of the first year of the war, the figures relating to oversea trade. It contains further facts and figures showing the extent to which the war has affected the ordinary channels of that trade and the sources from which its volume has been maintained in spite of this disorganisation. Included in the report are tables showing the effect of the war on grain and cotton freights, and on the import values of all the principal articles brought into the United Kingdom. The report surveys the normal shipping conditions before the war, and then compares by lengthy references to *post bellum* activities the changes that have taken place in our oversea carrying trade. We take the following passages from the report :—

#### War Conditions.

It is difficult to overstate the extent to which the war has disorganised all international trade, but the fact that the sources from which we have been accustomed to draw our supplies of food and raw materials have been radically affected must be realised in weighing the effect of the war on not only the employment of our ships, but also on prices in this country.

The military demands on our mercantile marine have been, and still are, exceedingly heavy, and the war risks have increased substantially the cost of transport ; but in the main prices have been governed by the fact that the war has closed many of our most important sources of supply, and in our endeavour to replace them from new markets we have been in competition with a world demand of an extraordinary character for both supplies and shipping.

#### Admiralty Demands.

The Admiralty have taken up for Government service about 800 —*i.e.*, 20 per cent.—of the steamships belonging to the United Kingdom which are of 1,000 tons net and upwards. Of these vessels about 250 are liners, and 550 general traders. Included amongst the liners are vessels certified to carry as passengers and crew 125,000 persons. The Admiralty have, in addition, taken up nearly 300 trading steamships of under 1,000 tons net, and a very large number of tugs, yachts and trawlers.

On the outbreak of war, the enemy seized and have since detained 42 steamships of 1,000 tons net and upwards. Since the outbreak of war, the enemy had destroyed up to the end of July last 139 steamships of 1,000 tons net and upwards. There were, therefore, in the first year of the war, 181 vessels lost to the enemy.

There are 78 steamships of 1,000 tons net and upwards locked up in allied or neutral ports in the Baltic and Black Sea.

As against these 259 ships withdrawn from our carrying trade, upwards of 100 German steamships of 1,000 tons net and upwards are now being employed in ocean oversea trade of the United Kingdom. There have been losses from marine perils, but such losses have at least been made good by ships that have been launched since the outbreak of war.

The net result is that the war, by losses and by the requirements of the Admiralty, has diminished by about 25 per cent. the number of British vessels available for the ocean oversea trade.

#### Shortage of Seamen.

The war has drawn very heavily on the crews available for the manning of the trading ships, and in the following ways :—

1. The Royal Naval Reserve, and the Fleet Reserve men have all been called up.

2. Many of the trading vessels employed as auxiliary cruisers carry larger crews than they carried as trading vessels.

3. The transports carry at least as large, and in some cases larger, crews than they carried as trading vessels.

4. The foreign seamen available have greatly decreased by—

(*a*) The mobilisation in Scandinavian countries and in Holland.

(*b*) By the extra employment offering on Scandinavian and Dutch ships, and

(*c*) By the fact that ports, such as Antwerp and Hamburg, at which a large number of foreign seamen were shipped, have been closed to British shipping.

In part the withdrawal of these men has been made good by others attracted by the greatly increased wages, but the supply from which these men have been drawn is the same as that from which the Royal Navy has so largely recruited. Additional Lascar and Chinese crews have been obtained, but many difficulties have been placed in the way of shipowners desiring to use the services of such crews.

The result is that the crews available for the vessels trading in the ocean oversea trade have been reduced by upwards of 25 per cent.

#### Bigger Ships and Larger Ports.

This marked change in the sources from which the imports have been obtained, has necessitated not only longer voyages and, therefore the greater use of ocean-going vessels, but it has also disorganised the work of the receiving ports. Ports which were able to accommodate the type of vessel by which the greater part of the foreign trade within home trade limits was carried on, are unable to deal with the larger type of ocean-going steamships. The imports have, therefore, been concentrated at the larger ports, and thereby both the facilities at those ports and also the means of distribution from those ports have been overburdened.

By reason of the greater distances to be covered, the average time occupied in the voyage has been increased ; and by reason of the faster vessels being preferred by the Admiralty and by the heavy demands made by the Admiralty for the services of the best firemen the speed average of ocean voyages has been lessened. Further the congestion at the ports capable of dealing with the vessels by which the imports have been carried has increased substantially the time occupied on the voyage. The number of ocean oversea voyages into the ports of the United Kingdom has fallen by 40 per cent., whilst the tonnage entrances have fallen by 29·5 per cent. These figures point to the conclusion that there has been a substantia reduction in the number of vessels employed, although there has been an increase in the average size of such vessels.

The figures given in the first six tables of this report are summarised as follows :—

1. Ships belonging to the United Kingdom available for trading purposes, and the crews available for the manning of these ships, have been reduced by 25 per cent.

2. The entrances showing the employment of such of those ships as are trading with the United Kingdom have been reduced by 26·9 per cent.

3. But the imports in weight during the last 12 months have been reduced by only 12·7 per cent.

#### Fuller Cargoes.

That the ships remaining available have been able to carry the trade is accounted for in several ways. First, a number of the vessels taken by the Government have been passenger ships, which were not in times of peace, large cargo carriers, and their places in the regular lines have been filled by general traders, which are big cargo carriers, chartered by the regular lines. Secondly, the steerage accommodation on a number of the emigrant ships has been taken out, and the space used for carrying cargo. Thirdly, the ships carrying the cargoes have been more fully loaded. This arises in part from the fact that the vessel on the long ocean voyage is, as a rule, more fully laden than the vessel employed in the cross-Channel service, upon which the ships are scheduled to sail at fixed hours, and partly from the fact that owing to the want of tonnage, greater efforts have been made to find space for the cargoes offering.

### Gross Earnings During the War.

The figures are not yet available to enable any complete estimate to be made of the gross earnings of British shipping under war conditions, but such earnings have exceeded the estimates for 1913.

The average rate paid by the Admiralty for passenger and cargo liners is probably below the estimated annual gross earnings of £10 per ton gross, whilst the earnings from the passenger trade have fallen off most seriously. As against these facts the liner freights on cargo have been substantially above the average.

The average rate paid by the Admiralty for the general trader is probably equal to the estimated annual gross earnings of £4 per ton deadweight carrying capacity, and the general traders' freights on the open market have been substantially above that figure.

The rates paid by the Admiralty have effected a substantial saving to the nation, but they have beyond question shortened the supply of tonnage available for the trade of the United Kingdom. Ships are more likely to be requisitioned in United Kingdom ports than elsewhere, and, in consequence, there has been a tendency on the part of the general traders to prefer employment between foreign ports. In so far as this tendency conduces to a shortage in the supplies carried to this country, there is grave risk of the apparent saving made by the Admiralty being far outweighed by increase in prices. Now that the question of profits is being dealt with by the Budget it would appear most necessary that the Admiralty should pay market rates so that there may be no discrimination by the general trade against the trade of the United Kingdom.

The rates paid by the Admiralty for the 800 trading vessels of 1,000 tons net and upwards which they are employing, have ceased to be a factor in the adjustment of the trading balances between this and other nations. The total freights earned from the carriage of the country's exports have been seriously diminished by the reduction in the volume of the exports—the total freights earned from the carriage of the country's imports have been largely increased—the earnings from the trade carried for foreign nations are still an important factor in the adjustment of our international accounts.

### Prices and Freights.

The effect of the rise of freights on the increase in the import values is difficult to determine, but speaking generally prices are only affected in so far as freights, by diminishing or increasing the supplies brought into the country, affect the relation of such supplies to the demand.

The following table shows the average price of wheat, and the average rates of freight on wheat, in the 12 months ended on July 31, 1913, 1914 and 1915. The comparisons are as under:—

| | 12 months ended July 31, 1913. | 12 months ended July 31, 1914. | 12 months ended July 31, 1915. |
|---|---|---|---|
| | s. d. | s. d. | s. d. |
| Average price of wheat per quarter 480 lb. ... .. | 32 6 | 32 0 | 48 2 |
| Average freight do. ... | 3 8 | 2 4 | 6 9 |

It will be noted from these figures that whilst the average rates of freight fell in the second of these years 1s. 4d. per quarter, the average price of the wheat fell only 6d. per quarter. It will be further noted that whilst in the war year the freights advanced 4s. 5d., the average price of the wheat advanced no less than 16s. 2d. per quarter.

It will be further noted that under normal conditions the wheat imports from our different sources of supply, which in our markets are in competition the one with the other, bear freights varying in amount as widely as the following:—

| | Average freight per ton. | |
|---|---|---|
| | 12 months ended July 31, 1913. | 12 months ended July 31, 1914. |
| | s. d. | s. d. |
| From, United States and Canada ... | 11 11 | 6 10 |
| .. Black Sea ports ... | 13 4 | 7 11 |
| .. Indian ports .. | 19 0 | 13 11 |
| ,, River Plate ports... ... ... | 20 7 | 11 1 |
| ,, Australian ports ... ... ... | 32 5 | 26 1 |

An examination of the monthly import values and freights for the war year show that the advance in price preceded, and did not follow, the advance in freights.

A comparison of the import values of cotton with the freights thereon confirms these conclusions. The figures are summarised as under:

| | 12 months ended July 31, 1913. | 12 months ended July 31, 1914. | 12 months ended July 31, 1915. |
|---|---|---|---|
| Average Liverpool spot price Mid Atlantic cotton, pence per lb. ... | 6·78 | 7·29 | 5·23 |
| Average cotton freights, Gulf ports, pence per lb. | ·28 | ·20 | ·39 |

It will be noted that in the war year the price of cotton fell 28 per cent., although the freights advanced 95 per cent.

The price of cotton fell in the war year as the supply exceeded the demand, and the monthly and yearly fluctuations in the prices and freights prove that the prices of cotton, as of wheat, in this country are governed by the relation of the demand to the supply, and that the freights only become a factor if and in so far as they affect that relation.

Sir Norman Hill summarises the report thus:—

First: The prodigious demands made by the Admiralty on the mercantile marine for both ships and men.

In addition to the patrol and mine-sweeping services, upon which hundreds of vessels are employed, the Admiralty has taken up about 800 ocean-going steamships. This number represents 22 per cent. of the total number of British oversea steamships; but it also represents 40 per cent. of the vessels by which, in times of peace, two-thirds of the whole of the ocean oversea trade of the United Kingdom is carried. Under normal conditions these 800 vessels carry inwards in the year on ocean voyages, each round voyage occupying on the average 70 days, upwards of 10,000,000 tons weight of cargo. The 800 vessels include passenger and emigrant ships certified to carry on ocean voyages 125,000 persons.

The Admiralty requirements, whatever they may be, must be fully provided for; but as a very great part of the work upon which the transports are employed is within home trade limits, the carrying power retained by the Admiralty is enormous.

Secondly: The manner in which the volume of imports has been maintained, although the greater part of the supplies we have been in the habit of obtaining from the continent of Europe has been cut off, and we have had to replace those supplies from far distant countries.

The commercial imports into the United Kingdom have been almost as great as in times of peace; and if to the commercial imports are added Government stores the normal volume of imports has been largely exceeded.

The burden of these imports, as well as the demands of the Admiralty, has fallen on the ocean-going steamships belonging to the United Kingdom, for the foreign shipping available has been reduced by 35 per cent.

Thirdly: The concentration of the imports at the comparatively-few ports of the United Kingdom which are capable of accommodating ocean-going steamships. It is not only the port accommodation, but also the means of distribution from those ports which have had to bear the burden of the displaced trades.

Fourthly: Subject to the maintenance of the oversea supplies of the United Kingdom and of the armies, the importance of maintaining the inter-foreign voyages so as to assist in the adjustment of our trading, balances with other nations.

Fifthly: The necessity for the utmost economy in the use of not only our ships and their crews, but also of the facilities of our large ports and of the means of distribution from those ports. Whatever may be the carrying power of our ships and at whatever rates of freights they may carry, it is now the receiving and distributing power of our large ports which controls absolutely the volume of the oversea supplies which finds its way into consumption.

It is not possible to extend appreciably the receiving and storing power of those ports, and if the nation is to receive the supplies the steady flow of traffic must be maintained.

Commercial enterprise has in the past year shown that it is able to overcome the greatest and most wide reaching dislocation in international trade that has ever had to be faced—but this has only been possible because in commerce the unthrifty use of either the ships or the ports would have led to immediate and probably heavy money loss.

## INVENTIONS AND THE TEST OF WAR.

At the inaugural sessional meeting of the North-East Coast Institution of Engineers and Shipbuilders, held in Bolbec Hall, Newcastle-on-Tyne, on October 29, the president, Mr. Herbert B. Rowell, took as the subject of his address the changes the war had brought about in industrial development.

In the course of his remarks he said that no sooner had the joint summer meeting of their Institution with the Institution of Naval Architects and the Institution of Engineers and Shipbuilders in Scotland closed after a most successful series of conferences, than the resumption of the routine of business life was followed by an international convulsion without parallel in history.

At those meetings they listened to papers and discussions giving the latest knowledge and opinions on the relative merits of aeroplanes and airships, of submarines and surface warships, of wireless telegraphy, and of the most recent forms and applications of steam and internal-combustion engines. Almost immediately afterwards, all were rudely put to the supreme test of war, and their next papers read in time of peace would record the astounding triumphs and failures of all these things. Chiefly, however, they would be an amazing record of an efficiency of the more recent devices under actual fighting conditions, constituting a splendid tribute to the thorough amalgamation of theory and practice that existed among our leading engineers; for, when forecast had failed it was rather where it dealt with the tactics of men than where it dealt with the performance of machines and appliances.

A few years ago eminent authorities regarded the heavier-than-air machine as a physical impossibility; to-day it was so reliable that we were teaching scores of men to fly with a couple of hours' practice, and flights for which prizes amounting to many thousands of pounds were offered three years ago were now performed as a matter of course by pupils. In 1909 a flight across the Channel with torpedo boats in attendance thrilled two nations; to-day, a flight from our battle-front to an aerodrome in this country was a matter of daily routine.

Size and power were on the increase. One heard of colossal aeroplanes propelled by two, three, or four engines, carrying several guns and a crew. At present these larger aeroplanes were still in a more or less experimental stage; but the number of ordinary one-seater and two-seater aeroplanes was such, and their duties so multifarious and so wonderfully performed, that they had modified tactics to an extent that only a soldier could appreciate, and showed the British estimate of the value of dirigible airships to be more accurate than that of our enemies.

The main factor in the development of the aeroplane which had led to this result was the greatly improved stability and control, which had reached an unforeseen stage of perfection. Where the management of a single-seater machine formerly took the entire attention of the pilot, it was now possible to make this secondary to his reconnaissance, involving the use of wireless telegraphy, a camera, and the working of the new Lewis automatic gun which could even be unshipped from its stand and fired over the tail of the machine by the pilot single-handed, while kneeling on the seat. All this had become possible owing to the capability of the machine to run without using the controls, and even landings had been successfully effected under the same conditions.

It might be reasonably held that the submarine was only less complete a success than the aeroplane. Infinitely more complex, and calling for even greater courage in operating, it scored heavily during the earlier stages of the war; nor could it be said that it was yet controlled, although the extraordinary ingenuity, courage and patience that had been exercised, not only in degree, but in extent, had considerably reduced a danger which at one time seemed a most serious menace. The ability of the submarine to fire a torpedo at close range was also said to have caused a considerable alteration in that weapon, by enabling the charge of explosive to be very largely increased.

Mines, submarines, the range of naval actions, and—contrary to the prophecy of a high authority*—their duration would probably result in considerable departures in warship design from existing practice, including increase of subdivision and decrease of armour. Evidence of this was already seen not only in the suggestions brought forward for modifications in the system of construction of warships, but in the evolution of a new, or rather the re-adoption and development of an old type, which could, however, be further improved.

The study of the forecasts that had been made from time to time as to the evolution of warships had always been of great interest however speculative they might have been, and yielded one definite conclusion whether for sea or land, which was that whatever method of attack one was least prepared to meet, the enemy was most certain to follow, and that the side having the most varied resources and preparations was consequently the best armed. Obvious as this conclusion seemed, every war produced illustrations of failure to observe it adequately, and this was an effective reply to advocates of an extreme line of action, of which just prior to the war we had exceptionally interesting illustrations in Sir Percy Scott's communication to *The Times* of June 5, 1914, and Lord Charles Beresford's speech at the joint summer meeting in the same year.

The great increase in the size of naval ordnance, which had become known to the public during the period of the war, was of special interest by reason of its influence on the future size and speed of vessels, and on the use of armour for their protection. Similarly, the construction of enormous howitzers in sections for siege operations, showed a great advance in this branch of artillery which with the arrangement for its transport, is also a matter of great interest and is no doubt the cause of the present ascendancy in the power of offence. The future developments in the size of naval guns were difficult to imagine, but whatever they might be, the naval architect of the day would be able to build the vessels necessary, and we would rely upon our civil engineers to see that we were not limited in our designs by those factors which came within their province.

### The Industrial Situation.

As he had shown earlier, prophecy, even by the greatest authorities, could only be indulged in with safety when the prophet knew, or when those who heard him could never know; but he thought little foresight or courage was needed to forecast a very serious industrial position at the conclusion of the war. The ignorance in which the country had been kept, the courtier-like deference of the Government to labour, the high rates of wages, defiance by labour of supervision, demoralisation caused by unmoral method of payment, excessive overtime, night and Sunday work with their accompanying abuses, had all combined to produce a condition of affairs which could not possibly continue.

Taking the most favourable assumption that victory would come to us and our Allies, the relative position of this country and her competitors after the conclusion of peace would not necessarily be to our advantage. We would go into the commercial arena with labour costs much higher than at any time in our history, and probably at a great disadvantage from the point of view of delivery

* "We may look for the naval action of the present day to last not more than, say, about five minutes after the range has been found."—*Transactions*, Inst. N. A., vol. lvi., page 26.

end internal industrial troubles, while Belgium, Germany and Austria, in times of industrial starvation, and with favourable freight conditions from the point of view of competition, would set to work more methodically and resolutely than ever, to recover their positions in the markets of the world.

Lloyd's Report for the year ending June, 1915, showed that in spite of the great reduction in output of merchant shipbuilding in the belligerent countries, the tonnage classed by the Society during the past year was within 1 per cent. of the average for the previous nine years, showing the extent to which Japan, Scandinavia and Holland, and especially the United States, had increased their output. It seemed perfectly clear, therefore, that if the conditions in this country remained such as to render the cost of production excessive, in a very few years the production of our shipbuilding yards would not be required, as with the general dissemination of shipbuilding knowledge and skill, it was only commercial considerations which enabled us to command the trade.

### A Ministry of Commerce.

The press, with commendable zeal, and to a great extent with reason, had severely criticised the conservative methods and want of enterprise of British manufacturers in foreign trade; but little had been said regarding the disadvantages under which they work owing to the attitude of our country's representatives abroad. It was quite comprehensible that the political representative of this country might consider that he could not properly assist a particular British subject to secure an order, but it was wrong that he should not realise that it was of first importance that the country he represented should secure the order. In Mr. Rowell's personal experience, after having secured an order he had known the German Ambassador go to the ruler of the country to get it cancelled. On the other hand, he had been told by a similar British representative that he could take no interest in the securing of orders even for warships by British subjects unless he could be satisfied that irregularities were occurring, and that while this was not the case he had no concern in the nationality of the successful firm. It was not too much to say that such an attitude, much less such an expression of opinion, would have been extremely likely to lose a German Minister his post.

Most of our important Embassies had now commercial attachés who in many cases were men of exceptional energy and ability, and who were doing excellent work. The extent to which they were supported personally, however, by the diplomatic side of the embassy was a matter which might be investigated with advantage to them and to the country they were endeavouring to serve. Intervention in affairs of business by a diplomatic agent was not likely to commend itself to that body, and if exercised in favour of one British firm against others would be grossly unfair; but every order secured by this country was not only a commercial benefit to the country, but its execution, by adding to the prestige of the country, was a diplomatic gain.

The work which was being done by the new Ministry of Munitions aided as it was by business men, had served, apart from its own functions, to draw attention to the urgent need of the establishment of a Ministry of Commerce, which would protect and encourage both home and foreign trade. The establishment of such a department would have some effect on the functions of the Board of Trade and the Foreign Office, but if the organisation were carried on by business men on business lines, the advantage would be incalculable.

### Education and Training.

There is a strong movement at present on the part of our educational authorities to collect information described by them as bearing on "how far our educational system is effective in providing men capable of applying scientific knowledge to industrial processes."

While we must not ignore the advantages some other countries have had over us, by reason of their works being established from the first upon a large scale and on modern lines, of Government support by bounties at home, and by diplomatic action abroad, still, there was no doubt that their recognition of science as a commercial asset, and also their system of organisation had been with some notable exceptions more complete than ours.

Possibly our colleges and schools for technical education could be improved, although in some cases this would seem difficult; and the extent to which their advantages were sought by many whose own countries did not give them similar opportunities, seemed strong evidence that what they claimed to do, they did well. Few were overcrowded, and no doubt all could if necessary be extended with ease. It seemed, therefore, that we must turn elsewhere for the main defects in our system of training.

In the preliminary training of our youths, before that of the technical college comes, or rather should come, into operation, there has been for many years a strong tendency and a growing one, to specialise at too early an age. If the object was, as it should be, to produce the man of the greatest use in a works, it was of vital importance to develop the mind of the student evenly so as to obtain the balance of mind essential in a man of judgment. Premature specialisation might tend to produce great capability in certain directions at an early age, but the usefulness of a specialist so trained, though great in his own field, was liable to depend very largely on the use that could be made of him by the technical man of more liberal education, who possibly, had had the invaluable training of learning to concentrate his mind on uncongenial subjects. For this reason he advocated very strongly that greater effort should be made in the direction of providing for a more prolonged general education, specially avoiding the serious error of discarding the study of all subjects which did not appear to have essential connection with the profession in view.

The complete absence of any consideration of the cost of production both in technical colleges and technical institutions, and its insufficient consideration in works except by the more highly placed officials and a special staff, were circumstances which required prompt rectification, in the interests of our national industries.

Speaking as one whose natural leanings and original training were entirely technical, and to whom the commercial side of manufacturing presented only a secondary attraction, he emphasised the opinion that it was not sufficient that capable financial men should be in charge of the finances of a business, although that was, of course, essential; what was also required was the complete permeation of the technical mind by an accurate appreciation of cost. This comes one day to most men who occupy leading positions in works, but it should be ensured at a much earlier stage in the career by education and early training in business, because it is only by the man of technical and scientific attainment that the most efficient use can be made of it.

Speaking as a technical man, and with a full appreciation of the high aims and achievements of technical men, he unhesitatingly advocated that not only should our technical colleges deal in their curricula with such questions as the relation of design to cost, and of cost to production, but that all technical institutions such as the North-East Coast Institution should, subject to proper control, open their doors to the reading of papers dealing with these subjects. Whether they should form the field of labour of a separate section of a technical institution or not, was a matter of secondary importance.

Attention should be directed to the facilities that exist, and the extent of the advantage taken of them, for enabling the student who has completed his college course and begun his business career, to keep in touch with developments in his profession. For this purpose he is dependent on the technical publications and, more particularly, on the papers read at technical institutions, with their resulting discussions; but too often he is liable to regard the obtaining of a degree or diploma as relieving him of the necessity of further study, and as rendering membership of a technical institution unnecessary.

## DEVELOPMENT IN MECHANICAL VENTILATION HYGIENICALLY.*

The work of physiologists during recent years has gone to show that the chief effect of ventilation and open-air treatment depends on the movement, temperature and moisture of the air, and less upon its chemical properties than was expected; and, in order to obtain economically adequate ventilation on physiological principles, without production of uncomfortable draughts, the ventilating system employed should be designed on certain lines herein indicated, embodying appliances specially adapted to the cooling of overheated engine rooms and the like aboveground, underground, or underdeck, by flooding them with fresh air from outside under slight pressure.

This positive ventilation or a continuous change of air also removes all noxious gases and smells emanating from the oil and bilges.

The principle employed is exemplified in the large electric power-house of Saint Denis, outside Paris. There is a long switch-house, with switch-board about 500 ft. in length.

In this case a series of ten open fans, each having 25 in. diameter air-inlet and running 700 r.p.m., is installed along the length of the switch-house ceiling, and delivers in all 90,000 cubic ft. of fresh air per minute or 5,400,000 cubic ft. per hour, and distributes it across and through the switch-house into the power-house; in other words, the whole cubical air contents of the switch-house are changed once every 40 seconds or 90 times an hour, and the inside temperature of the switch-house reduced from say 120° Fahr. in summer to that of nearly the normal outside atmosphere, without production of unpleasant currents, for a total expenditure in electrical power of 14,000 watts.

Fig. 1 is a transverse sectional view of the engine room of a transatlantic liner showing the application of the recommended method for flooding the engine room with cool fresh air under moderate pressure.

The air is delivered into the engine room by a large open fan placed at the junction of the lower ends of the air-shafts, so that the full volume of fresh air, equal in this instance to about 150,000 cubic ft. per min., is propelled into and properly distributed through the engine room without loss from delivery ducts. When desirable, the air in the engine room may be changed 120 times per hour without uncomfortable draughts.

An essential characteristic of this application is that the cool air is drawn, not forced, down from the upper deck and delivered laterally by open fans placed as low down in the engine room as permissible, so as to flood the whole engine room with air, the cooler incoming air falling towards the floor, displacing the heated air and expelling it up the main hatch or hatches or other exits without the necessity for extract fans.

The system shown was installed in the engine room of the *Lusitania* in 1912, and was so successful that the engine rooms of the later Cunard vessels—*i.e.*, the *Aquitania*, *Andania*, *Alaunia*, *Transylvania*, *Tuscania* and *Aurania*—were similarly equipped.

Fig. 2 is a reduced part longitudinal section through the central engine room of the *Aquitania*, showing the arrangement of inlet conduits and fans and indicating how the change and movement of air are effected at the level of the starting platform 100 ft. below the upper deck from which the fresh air is drawn.

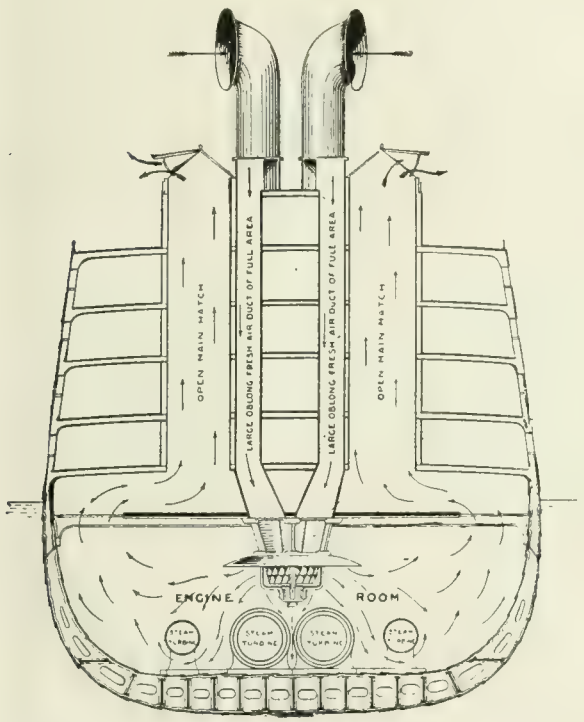

OPEN MAIN HATCH
LARGE OBLONG FRESH AIR DUCT OF FULL AREA
LARGE OBLONG FRESH AIR DUCT OF FULL AREA
OPEN MAIN HATCH
ENGINE ROOM

**Fig. 1.—Cross Section of "Aquitania," showing Ventilating Arrangements.**

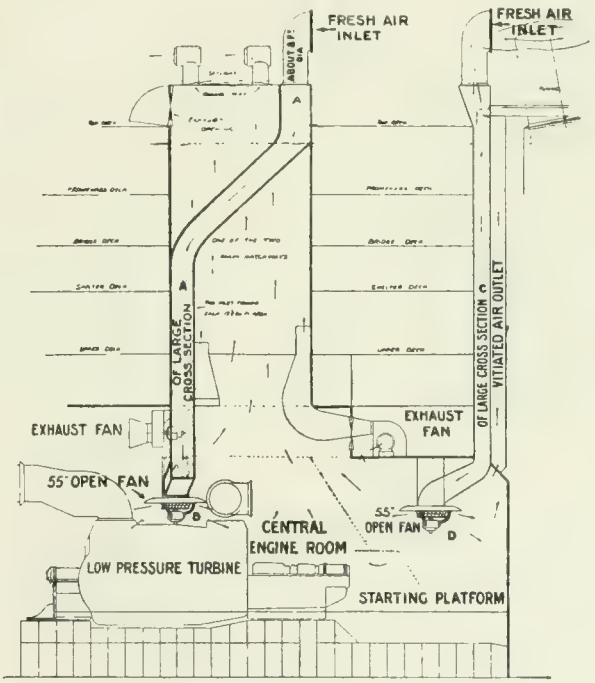



**Fig. 2.—Part Longitudinal Section of "Aquitania," showing Ventilation of Engine Rooms.**

The main supply of fresh air for the central engine room is drawn down four vertical shafts, two of which marked "A" serve one open fan marked "B," and each of the other two of which marked "C" serves a separate open fan marked "D." These three fans collectively distribute and diffuse 180,000 cubic ft. of fresh cool air per minute, without unpleasant draughts, into the lower part of the engine room with an expenditure of 66 h.p. In the two wing turbine rooms 120,000 cubic ft. of air per min. are distributed by other fans requiring 68 h.p. The condenser and turbo-dynamo compartments receive 120,000 cubic ft. of air per min., absorbing 66 h.p. For circulating air in and emitting it (by separate fans) from the various compartments mentioned, 167 h.p. is required, 273,000 cubic ft. of air per min. being handled in this manner.

The net result is that the atmosphere at these depths is kept fresh and wholesome at an average temperature of about 75° Fahr.

* Abstract of a paper read by Mr. James Keith at a meeting of the Institute of Marine Engineers held in London on Tuesday, November 2.

A similar result could be obtained by blowing or forcing air downwards by closed fans from the topdeck. With similar structural conditions, however, a much higher water gauge pressure difference would have to be created in order to obtain the necessary volume below, and the expenditure of horse power would be considerably greater.

In this connection, it may be desirable to point out some of the reasons for the advantages obtained by drawing in the air and distributing it without inside conduits as distinguished from pressing it towards a room from the point of view of the power consumption requisite for good ventilation.

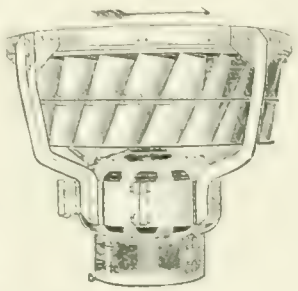


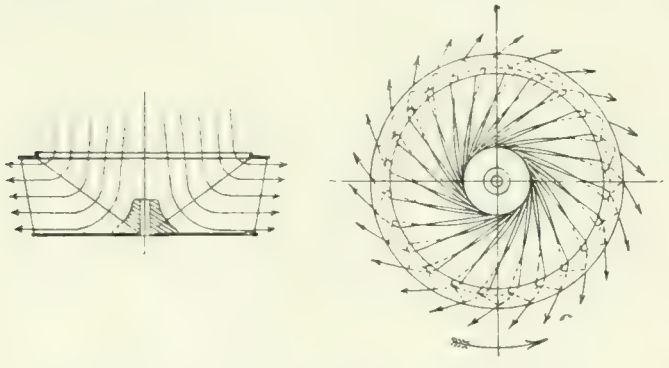
Fig. 3. Open Fan.

A fan fitted to the lower end of an air duct may be so arranged that it serves not only to handle the air but also to diffuse it in a favourable manner over the room to be ventilated. If the air be forced to the room, however, distribution pipes and nozzles are necessary to effect an even ventilation all over the room.

While, therefore, in the former case there is only at one place, namely in the fan, a transformation of energy and change of velocity of the air, in the latter case a second transformation takes place where the air passes through the nozzles into the room. In the former case the absolute velocity of the air, where it leaves the fan, is used to distribute the air in a favourable manner; in the second case such velocity is lost to a large extent in eddies.

It may also be pointed out that on board ship, when the principle of sucking the air to the room is adopted, it is usually easier to have the smallest number of bends and therefore a more efficient passage for the air till it enters the room. Again, the fan and motor are not so much exposed to atmospheric conditions and are more easily watched and controlled when fitted in the engine and boiler room, than when arranged on deck.

The only way to prevent draught currents from the nozzles below



**Figs. 4 and 5.—Showing course of Air Currents induced by Fan of Type, as Fig. 3.**

when forcing the air downwards would be to use large distributing diffusers in the engine rooms in order to deliver the full volume desired at a lower velocity.

In actual practice these points are well exemplified in the case of the *Aquitania*, in which, because of machinery difficulties, the two wing engine rooms are served by the plenum method at a cost of one-third more power than is required for the ventilation of the central engine room in which the system illustrated and recommended is installed, the proportions of downward air ducts and air volumes delivered being identical.

When it is considered that many modern underdeck (as well as underground) engine rooms have a uniform or an unvarying overheated "windless atmosphere" of from at least 100° Fahr. in winter to 150° Fahr. in summer, notwithstanding the presence of old-fashioned apparatus expected to secure so-called mechanical ventilation, the urgent necessity for a practical remedy will be appreciated.

Until about four years ago it was unusual to employ open fans for ventilating engine rooms, &c., and it was difficult to obtain open fans capable of creating efficiently an under-pressure in a duct or air inlet sufficient to induce an air current of fairly high velocity.

To meet this demand, a fan as shown in Fig. 3 has been specially developed.

It will be seen that the impeller vanes are scooped on the inlet side and are of such shape that they slice into the incoming air and divert it gently from the axial into the radial direction, as shown conventionally in Fig. 4. The outer longitudinal edges of the blades are inclined backwards with reference to the direction of rotation, as shown in Fig. 5. Experience has shown that impellers so bladed do not tend to race when employed as open fans running in parallel, and that there is little tendency for the air to re-enter the space between the blades and cause eddies when the fan is running against a comparatively high pressure. This design ensures strength and rigidity without internal stays.

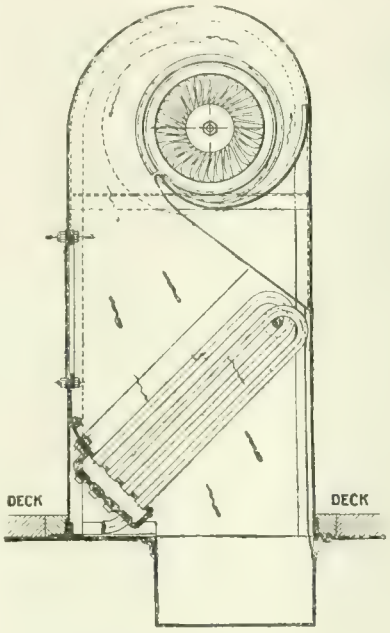



**Fig. 6.—Rhigothermo Plenum Ventilating Case and Fan Installation.**

Up to this point there have been discussed only means of freshening the atmosphere in overheated engine rooms; but in certain circumstances it is often necessary to furnish fresh air in volume, either artificially cooled or warmed.

Fig. 6 represents a transverse section of what is commercially known as a Rhigothermo plenum ventilating cased fan installation for performing the work described. By way of indicating the mechanical efficiency of the installation represented it may be stated that with a difference of temperature of 40° Fahr. between the temperature of the outside air in cold weather and that of the air delivered into the deck main ducts, every 1,000 cubic ft. of air so delivered, at a constant water-gauge pressure of 2 in., requires for electrical current the expenditure of only ½ h.p.

It will be understood that the fan draws in fresh air, compresses it to a pressure sufficient to ensure its delivery to the main duct, the flow being only slightly impeded by the heated or cooled surfaces around which it passes, while the air delivered, being in no way initially overheated, remains in fresh condition. The installation shown is to be distinguished from constructions which require air to be forced through narrow tubes in a cylinder. The Rhigothermo apparatus has already been successfully installed on the latest Canadian Pacific liners as well as on the latest Cunarder, the *Aurania*.

Aged Seafarers' Pensions.—The Council of the Mercantile Marine Service Association have confirmed the grants of pensions amounting to £37 per annum and authorised the admission of a widow of a master mariner to the Andrew Gibson Widows' Home at Egremont. Upwards of 600 aged shipmasters, officers and seamen and the widows of mariners are still in receipt of continuous support from the funds administered by the Mercantile Marine Service Association.

## DOCK & HARBOUR EQUIPMENT.

### CRANES AND TRANSPORTERS FOR THE DOUBLE DUTY OF LOADING AND DISCHARGING COAL.

I.

To any one dealing with the question of coal handling, the apparently infinite variety of conditions to be met with (coupled with the fact that loading and unloading on land and water have to be constantly considered together) forms a subject of very considerable interest, and the writer in the following articles has endeavoured not only to describe the conditions which govern the size of the plant, but by actual examples to show how existing requirements have been successfully met.

In recent years the steadily increasing bulk in which coal is conveyed both by sea and rail has led to a demand for high speed machinery to deal with the cargoes, and in order to obtain the best results it has been found necessary, wherever the conditions permit, to make use of grabs in place of hand-filled skips. While, however, at the present time there are probably few or no demands for the lifting and transportation of heavy loads that cannot be dealt with economically by some form of crane or transporter, it must always be borne in mind that the speed of working does not depend upon the mechanical appliance alone (which can be made to lift and transport any load at any speed required), but more particularly upon—

(1) The size of the truck or the hatchway of vessel to be loaded or unloaded ;

(2) The speed at which the necessary trimming can be made by human labour.

Both the above decide the size of the load which can be conveniently and expeditiously handled.

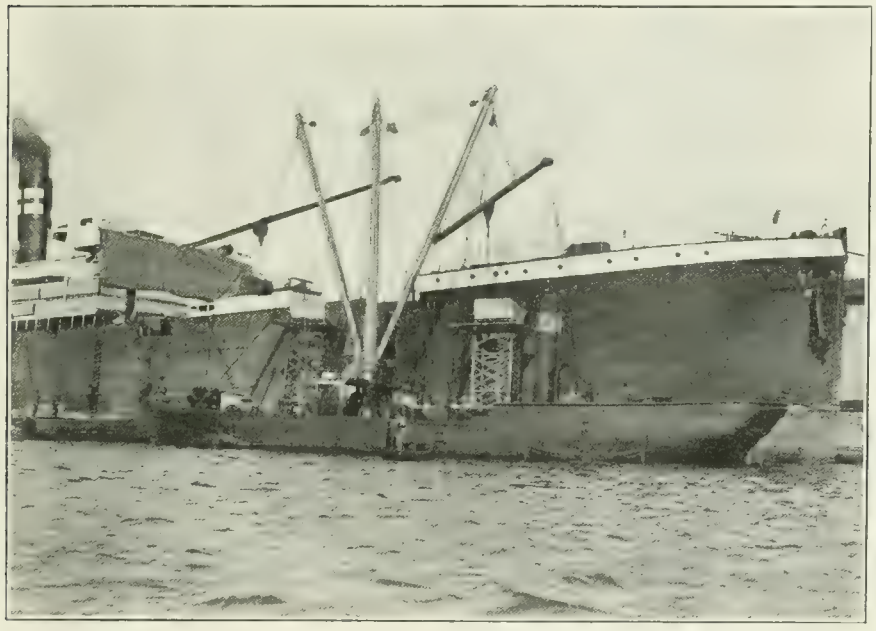
It is, therefore, evident that in dealing with plants of this nature the speed of working depends upon the existing conditions of each case, and there is no definite rule to which one can adhere, although experience has shown in this country that a net load of 25 cwt. to 40 cwt. is the maximum that can, as a rule, be most expeditiously handled

In the United States, however, when a new scheme for handling ore or coal is decided upon, the crane or transporter frequently forms but an item in the complete new plant, and the truck to be unloaded and the hatchway and interior of the vessel are made suitable for the size of the grab it has been decided to use. Very rapid unloading and "world's records" are thus obtainable, but in Europe, and especially in Great Britain and many of the Colonies, the trucks and vessels to be dealt with already exist, and thus the size of the grab is practically pre-determined.

It will be most convenient to take a series of actual cases, the first being one where the problem was to coal vessels in a harbour by means of a small coaling vessel and lighters alongside. The vessel used was a small wooden schooner of about 350 tons d.w. 104 ft. long by 24-ft. 4-in. beam, fitted with two masts, the lighters being ordinary coaling barges. The coal had to be delivered ex the vessel or the lighters either into the side bunkers or the deck hatch of fairly large steamers, having a maximum height of 28 ft. above water level. The work was done in smooth water.

The apparatus installed consisted of two Temperley transporters, each 55 ft. long, two steam winches for driving same, together with the necessary multitubular boiler.

The Temperley portable transporter is a self-contained apparatus intended chiefly to be used on vessels, and operated by a winch. It consists of an automatic traveller of either the single-purchase or the double-purchase type, a beam on which the traveller runs, suspended from any convenient support, such as the ship's derrick or a span between the masts, and held in an inclined position by guys, and a lifting rope which is led to the winch for lifting, transporting and lowering the load.



**Coaling Vessels in Harbour by Temperley Portable Transporters.**

The transporter is hung at an inclination of about 1 in 3, with the high end either inboard or overside, according to circumstances and is so placed across the vessel as to command simultaneously the hatchway and lighter, or other vessel alongside.

For use on vessels the transporters are made from 30 to 65 ft. long, in multiples of 5 ft., and for loads up to 30 cwt. The beams are provided at every 5 ft. of their length with stops, at which the traveller can be arrested at the will of the operator, and the load lifted or lowered as required.

The Temperley portable transporter enables loads to be taken up or put down at a distance of 30 to 50 ft. from the vessel's side, and the path taken by the load being in a direct line from point to point prevents any interference with the rigging or other gear on the ship ; the points at which the load can be lowered being fixed by the position of the stops on the beam, the load can be lowered with accuracy through a small hatchway without loss of time or danger of striking the hatch coamings.

These transporters, owing to their light construction to render them portable, and the fact that they are generally suspended from the derrick of the vessel's mast, are not suitable for working with a grab. Turnover skips are therefore used, holding a net load of 20 cwt. of coal (40 cubic ft.) and from 40 to 50 trips are made per hour, provided the skips can be filled with sufficient speed. In everyday practice, transporters of this type are doing 60 round trips per hour on larger coaling vessels.

In order to overcome the difficulty of getting big skips of coal under the boat deck of a steamer, it is interesting to note that two telescopic towers of suitable height are fitted on the deck of the schooner into which the skips discharge and the coal is thence run down a chute into the side bunkers of a large steamer, or, if desired, on to the deck of a medium-sized one. The accompanying illustration

shows the vessel with transporters in position, and the telescopic towers can clearly be seen.

It should be mentioned that this small installation has proved eminently satisfactory, and other and larger coaling hulks have been fitted with similar machines for the same company.

Temperley portable transporters are in use by all the leading navies of the world, and are being largely used on coaling hulks in this country and abroad.

The requirements of the second example were much more onerous, providing for a floating coal elevator and transporter for the rapid handling of coal either from lighter or collier, and delivering same into steamers' bunkers either through hatches in the deck or through side ports. The output required by one machine under ordinary working conditions was 100 tons per hour, the capacity to be maintained when consideration was given to trimming in the lighter or collier.

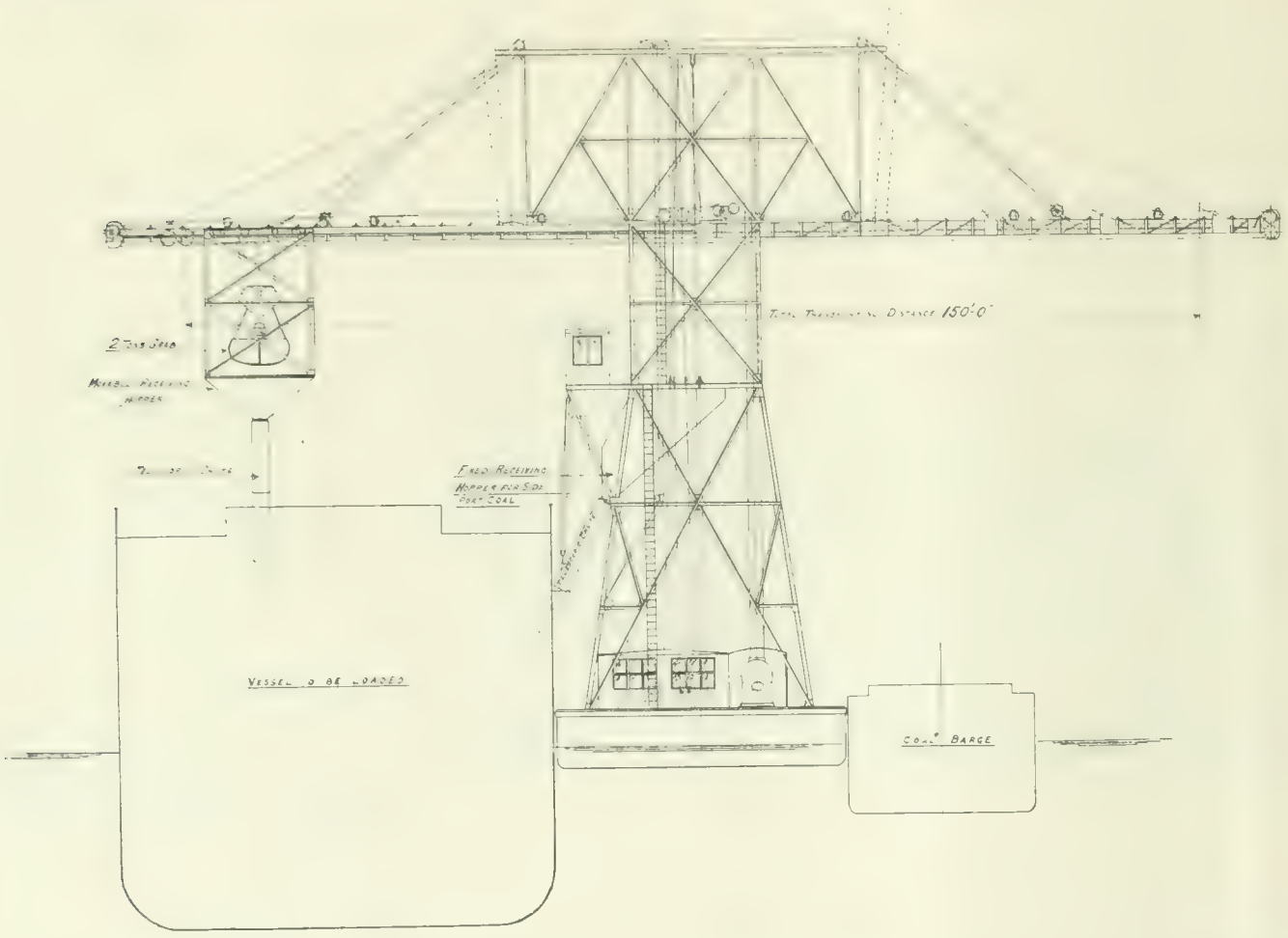
The general arrangement drawing above shows how these requirements were met, and the following explanation gives additional particulars. Steam power is used; the height of lift from water level to underside of hopper being 45 ft. clear, and the total transporting distance 150 ft. A Temperley transporter, fitted with a Temperley grab having a capacity of 2 tons, is used, and special high-speed machinery has been adopted. This machinery enables the grab to be lifted at the same time as the transporting takes place, and at least 50 to 60 trips per hour can be made with full load, provided there is the necessary coal to grab.

A movable receiving hopper with telescopic chute is fitted on one arm of the cantilever, arranged to travel by hand power, and the grab delivers into this when coaling through the deck ports. A fixed hopper with two telescopic chutes is attached to the tower of the transporter for side bunkering, suitable gear being provided for raising or lowering or moving the chutes. The driver's cabin is situated in an elevated position, and the driver obtains a clear view of the load, which is under his sole control. The whole machine is mounted on a non-propelled pontoon, which is towed into position when coaling is to take place.

This installation illustrates in many ways the adaptability of transporters for coaling in harbours when vessels cannot be brought alongside the quays.

The examples given above were designed and executed by Sir William Arrol & Co., Ltd., Glasgow.

*(To be continued.)*




**General Arrangement of Temperley Tower Transporter on Floating Pontoon, by Sir Wm. Arrol & Co., Ltd., Glasgow, for Bunkering Steamers either through Deck or Side Ports.**

Spanish Shipping Companies and State Subsidies.—The *Gaceta de Madrid* of October 12 announces that the "Asociacion de Navieros," of Bilbao, has notified the Spanish Government that 23 companies belonging to the Association are prepared to forego their rights, as from September 17 last, to the navigation bounties to which they are entitled under the Spanish Shipping Law of 1909. The Association states that owing to the efficacy of these bounties, to the period of prosperity experienced in the shipping trade during 1912 and 1913, and, above all to the extraordinary benefits derived from the present exceptional circumstances, the majority of the Spanish shipping enterprises are in a prosperous condition; they are able to look forward to the future without anxiety, and therefore no longer need these State subsidies. The Government, in a Royal Order accepting the offer of the Bilbao Association, invites the other Spanish navigation companies receiving subsidies to forego their rights to the same.

# GENERAL NEWS SECTION.

## PERSONAL.

At a meeting of the Dublin Port and Docks Board last week Mr. L. Brady was elected to the position of Assistant Harbour Master.

The death occurred on October 31, at 57, Carlton Hill, St. John's Wood, N.W., of Mr. Frederick Dwight Johnson, late Chairman of the Consolidated Pneumatic Tool Company, Ltd. Deceased was 56 years old.

Lord Devonport has presented to three employees of the Port of London Authority—A. E. Lane, clerk; H. Addison, lockman; and D. Prendergast, corn porter—awards from the Royal Humane Society for gallantly rescuing persons who had fallen overboard.

Colonel William Frederick Pilter, V.D., C.B., aged 84, of Addlestone, Surrey, formerly superintendent at the Board of Trade Mercantile Marine Office, North Shields, and Staff Paymaster, R.N.R., J.P. for Northumberland, left net personalty £21,527.

Mr. John Hunter, Managing Director of Sir William Arrol & Co., Ltd., Glasgow, has resigned his seat on the Board of Directors of that Company and has accepted the invitation of the Minister of Munitions to become Director of Factory Construction in connection with the National Projectile Factories now being erected in various parts of the country.

Lieut. J. Lloyd Williams, Royal Flying Corps, who was wounded in France last week, served with Harland & Wolff, Ltd., Belfast, between 1902 and 1908, in the drawing office and other departments. After a short spell at sea as an engineer he returned to Belfast and took up aviation, and received his commission as a flying officer some months ago from the 20th Royal Fusiliers (3rd Public Schools Battalion).

Second-Lieut. Patrick Hamilton Forrester, of the 8th Black Watch, who died on October 11 of wounds, was an apprentice in the engineering department of Scott's Shipbuilding & Engineering Company, Greenock. He left there in September, 1914, to enlist in the Public Schools Battalion (16th Middlesex Regiment), and served as a private till he received a commission in the 8th Black Watch, which he joined a week before its departure for France.

Mr. J. W. Kempster, D.L., one of the principals of Harland & Wolff, Ltd., gave an interesting address on October 29, on the part played by Lord Pirrie, Sir Edward Harland and the Rt. Hon. A. M. Carlisle, D.L., in the development of the shipbuilding industry in Belfast. The occasion of the address was the anniversary of All Souls' Church, in connection with which Mr. S. Shannon-Mallin, B.L., who is well-known to local engineers, gave a lecture on "The Second Congregation of Protestant Dissenters as a Factor in the Civic Progress of Belfast." The three shipbuilders mentioned were connected with this congregation.

Mr. J. Herbert Cory, J.P., was, on Thursday last, unanimously adopted by the Cardiff Conservative Association as candidate for the Parliamentary representation of Cardiff rendered vacant by the death of Lieut.-Colonel Lord Ninian Crichton-Stuart. Mr. Cory being a man of business and actively connected with the coal and shipping industry is well fitted to represent one of the most important shipping centres in the world. He is a director of John Cory & Sons, Ltd.; chairman of Cory's Trading Company, Ltd.; director of the Seville & United Kingdom Carrying Company, Ltd.; Cardiff Channel Dry Docks & Pontoon Company, Ltd.; Tyneside Engine Works Company, Ltd.; Bute Shipbuilding & Engineering Company, Ltd.; Mercantile Pontoon Company, Ltd.; and Tredegar Dry Dock & Wharf Company, Ltd. He is a J.P. for the county of Glamorgan and the borough of Cardiff.

## THE EXCESS PROFITS TAX.

### Shipping and Underwriting Interests Discussed in Parliament.

On Wednesday of last week the Finance (No. 3) Bill was discussed in Committee. During the course of the debate on the excess profits tax several questions relating to shipowning, marine insurance and shipbuilding profits were raised.

On the discussion as to whether the period of assessment should date from the outbreak of the war, Mr. Newdegate cited the case of a firm in Birmingham. This, he said, was a comparatively new firm, at present employed by the Admiralty as shipbuilders. Their books were made up on October 31 each year. In 1912-13 they made a profit of £7,000; during 1913-14 they made a profit of £18,444, made on peace orders, at peace prices, before the war broke out. If the Bill became law as it stood at the present time this firm —although they had hitherto paid no dividend, all the money which they have made having been put into the concern to make it sounder, and to put it on a better basis—would have to pay simply because their books were made up on October 31, something like £9,000 to the Treasury, whereas, a competitor in the same business, making the same profit, would not be mulcted in that sum if the books were made up on August 31. Surely that was not fair. As the Bill stood, simply because a certain day had been put into it for accountancy, some firms escaped and other firms did not escape. Those firms which did not escape were taxed on a very much higher standard than the firms which were lucky to have their books made up at an earlier period. He was not asking the right, hon. gentleman not to tax war profits, and not to tax profits made since the commencement of the war, but he did ask him not to put one trading firm in a worse position than another trading firm simply because he had put August 31 in the Bill as the date after which firms who had their books made up must pay this 50 per cent. excess profits tax.

#### Effect on Shipping and Coal Exporting.

Mr. Houston said that the tax would have the effect of driving capital abroad; let them take shipping, for instance. If the whole of the shipping in the world belonged to British shipowners, no fault could be found with the tax. But they had to remember that at the present time the shipping which benefited more than any other was neutral shipping. It was called neutral shipping because the ships flew the flags of neutral nations; but very often instead of neutrals managing the shipping, Germans were doing it, although not under their own name. They were piling up enormous profits. They were subject only to a very small income-tax in the United States, and they were not subject to this excess profits tax. He had in mind one firm in New York which had made enormous profits since the war commenced, and was now investing its profits in shipping. These firms had already succeeded in interfering very considerably with British trade; in fact they had captured some of it, and at the end of the war we would have to fight to recover that trade. Our opponents had been acquiring capital subject to no tax which they would be in a position to use against us in our endeavours to regain our trade.

Sir C. Cory said that while most of the commercial community did not object to paying their fair share towards the war, there was a very widespread feeling amongst that community that this excess profits tax did bear unjustly upon certain sections. Hon. members would have received a letter from the Cardiff Chamber of Commerce setting forth a grievance with regard to this tax, and which he had no doubt applied equally to other parts of the United Kingdom. It was with regard to exporters of coal, who entered into large contracts to foreign ports. It was a custom in South Wales to make these contracts in October or November for the ensuing year. In 1910 they entered into such contracts for millions of tons at, say, 20s. freight. No sooner did they meet these contracts and begin to deliver at the commencement of the year than the freight began to jump up 2s. or 3s. a ton, and, therefore, in fulfilling those contracts in 1911, they met with a very heavy loss. In 1912 the same thing happened again, and also in 1913. As the member for Hexham said, 1911, 1912 and 1913 were the very best years for

shipowners, and it would be only too delightful to take those three years' average for the rest of his life. At the commencement of 1914 freights began to drop. Here in 1914, instead of making a heavy loss as in 1911, 1912 and 1913, a profit was begun to be made up to the time the war broke out. Then freights began to jump up, and they were going to make those companies who made those contracts in 1911, 1912 and 1913 take an average of two years of those three years, which would mean a heavy loss. Half the profits made in 1914 were to be taken away from them. These men had to compete with America and other countries which exported coal just now. The Americans had taken contracts in France, which the French Government had arranged with large companies in France, for 2,000,000 tons. After the war was over the English companies would naturally try to get the contracts back in Brazil and other parts of the world, but to do so they would have to put in a price at an enormous sacrifice, and it was difficult to see where they would find the capital to get those contracts back. Many concerns, such as colliery companies, invested their profits in new developments, and he had one case in mind in which all the new pits were sunk entirely out of revenue. They limited their profits to 10 per cent. for a number of years, and they let all their excess profits be used for new developments. Instances had been given of firms who had contracts for shipbuilding made perhaps in 1910. They would be in operation for 1911, 1912, and 1913, and therefore would not be brought in for computation until 1914, when the contract would be completed. It was obvious that some of these profits brought into 1914 should have gone into 1911, 1912, and 1913, and that constituted another hardship.

### The Position of Underwriters.

Sir Edward Beauchamp, while not objecting to the excess profits tax, said that as regarded its application there would be a good deal of hardship and injustice if it were applied in the wholesale and indiscriminate way which the Government proposed. He appealed to the Government to deal more fairly with underwriters. The underwriter, if he had made—and he hoped he had—some extra profit during the war had done so by taking extra risks and hazards. With regard to the marine business, his ordinary business, he had the accumulated experience of years to guide him as to the premium which he should charge. But when the war broke out he had to embark on war risk insurance and had nothing whatever to guide him. There had been no war in the memory of any underwriter, where two great naval Powers were opposed to each other. During the Russo-Japanese war they had a small experience. There were two maritime nations engaged in war, and the underwriters embarked upon war risk insurance, and he was sorry to say the experience of that war was not very satisfactory to the underwriters. When this war broke out the Germans had modern vessels of high speed with which they intended to prey upon our trade, with the hope and the expectation of paralysing it. Therefore there was no doubt whatever that the underwriters who engaged in that business ran very considerably increased risk. There was no question of underwriters charging an exorbitant premium. That premium was paid for them really by the Government under the scheme which they launched directly the war broke out, and by which they really took a large proportion of the business, and the premium at which they took it was fixed. That scheme was introduced with the object of keeping down the premium, which was never to rise above a certain level. The level they fixed was 5 per cent. It was never to exceed 5 per cent., and was never to be lower than 1 per cent. Naturally the underwriters in the open market could not expect to get a higher rate than that which was charged by the Government insurance scheme. Then the Government scheme limited the taking of risks by the war committee to cargoes in British vessels. All the neutral vessels and the cargoes of neutral vessels had to be covered somewhere, and these were covered in the open market. The underwriters and Lloyd's filled up the gap, and greatly enabled the seaborne commerce of the country to be carried on without interruption. The Government did not take those risks; they were excluded from their scheme. The underwriters took the risks, and now the Government came in and asked for half the profits they made out of those risks. What they asked the Chancellor of the Exchequer to do was to allow them to deal with the volume of profits and with the percentage of profits on this war risk insurance in the following way. If in the pre-war period an underwriter had made an average of 15 per cent. on the premium income which he received, and in the war period he had made 25 per cent., they should be allowed to deduct the 15 per cent. from the 25 per cent., leaving 10 per cent. of which 50 per cent. should go to the Government and 50 per cent. should be retained by the underwriter. That seemed to be reasonable, and he thought anybody who really knew the way in which underwriting business was carried on would agree that that was a fair request. Underwriters would agree to that with willingness and readiness; but they did think that if the proposals of the Bill were carried out in the way that they stood at present it would be dealing somewhat unfairly with underwriters.

He also asked the Financial Secretary to the Treasury how he proposed to deal with the following particular case. A young underwriter started business, and three gentlemen entrusted underwriting business to him, for which he received a salary. On January 1, 1914, having been entirely successful in his business, three other gentlemen entrusted their business to him, thereby doubling his salary. Under the Bill, as he read it, 50 per cent. of that extra salary would have to come back to the Government. That seemed to be a somewhat hard case, and he did not know whether there was any provision in the Bill to meet a case of that sort.

Mr. Booth also appealed on behalf of the marine insurance companies. Sir E. Beauchamp had spoken with authority for the underwriters at Lloyd's, but he (Mr. Booth) would like to make a special appeal as to whether he was perfectly satisfied in his mind that he was dealing fairly with these institutions compared with ordinary businesses. "Am I right," he said, "in interpreting the wishes of the Chancellor of the Exchequer to be that we should press our point for a larger interest in the matter, where he referred to firms which had had two bad years or were limited in capital? If he suggests that that is the proper ground, and it seems to me to be so, on which we should urge our case, I think I should be content with that. I want to deal with a case where the ordinary business of the firm was not limited in price by the Government or Government action or competition. The Chancellor of the Exchequer to-day said the main reason that led him to bring in this excess profits tax was to get a revenue from people whose income was largely increased owing to the rise in prices. Now in regard to insurance companies, there is a fixed rate, so that the question of the increase in price does not apply. If I cared to be critical, I should almost say, on the strength of the Chancellor of the Exchequer's words to-day, that none of the insurance companies, particularly the life and fire insurance companies, should come in at all. They are charging the same rate for life insurance and fire insurance, and he did not suggest that insurance companies should be exempt, or wished to be exempt, although there was a case both for marine insurance companies and Lloyd's underwriters. The shipowner could get whatever freights he liked, and the shipper could get whatever price he liked for his commodities and there was no Government interference. He did not increase his risk." Proceeding, he said that Sir E. Beauchamp and his fellow-underwriters at Lloyd's, and the marine insurance companies had the increased war risk while the shipowner was getting larger increased freights and making larger increased profits, not running any greater risk, and not employing larger staffs in many cases. When they came to marine insurance and the marine underwriters, their increased profits were the result of taking increased risks. The underwriter had to consider how far he could safely give underwriting policies from the funds at his disposal. If the Government had not interfered—if they had allowed the free flow of the markets, with the probability that there would have been double the rate of war risk, then if they had come with their excess profits tax, and taken a large slice, there would have been no objection, and underwriters would have been in a better position than they would be in now even if the tax did not apply. But they were limited in their premium income where no other trade was. They were prevented from getting the undue profits enjoyed by other traders, but the mere fact that the premium was so limited kept many powerful companies out. They did not think the rate remunerative. It had turned out to be so. It had left a margin of profit to share. It might not in future, and he thanked the Government for agreeing that if there was a loss in future years it should be taken into account in this matter. But he still hoped that he could convince the Government that there was a case for these courageous underwriters to have more elastic provisions with regard to that percentage allowed them. The 6 per cent. which was allowed to traders was on capital, and underwriters were asking for some percentage on the turnover. That was, on the magnitude of the risk. There was a real danger, unless some consideration was shown to underwriters, that a neutral marine insurance company, say in Holland, could quote for these war risks for neutral ships, and could quote for them freely where London could not, because if they got a margin of profit they would be able to keep it all in Amsterdam, whereas a London company would have to part with half of it.

# FROM OUR CORRESPONDENTS.

## CLYDE AND DISTRICT.

(From Our Own Correspondent.)

**Glasgow.**

The statistics relating to the output of new tonnage on the Clyde for the past 10 months indicate that the amount of mercantile shipping launched during 1915 will fall far short of that of previous years. Up till the end of last month the total output was 204,600 tons, compared with 402,000 tons for the corresponding 10 months of last year and about 560,000 tons at the end of October, 1913. Provided the average amount of tonnage is launched during the present month and the next, the output for the year will be about 245,000 tons, against 460,200 tons in 1914 and 692,600 in 1913, the naval work being left out of account each year. During last month there were launched on the Clyde nine vessels of 18,720 tons. Several small vessels were also launched on the Tay and Forth, and at Aberdeen four steam trawlers were put into the water during October.

### Shipping Traffic at Glasgow.

Some delay has arisen at Glasgow harbour during the past week on account of the great pressure of trade in the export of coal and the import of iron and other ores. Vessels have had to lie at the Tail of the Bank occasionally until berths at Rothesay Dock were available, and in several instances steamers have been diverted to other ports on the Firth of Clyde as it was not possible to deal with them promptly at Glasgow. The fault has lain not so much with the harbour authorities as with the railway companies, who have been unable to provide a sufficient number of wagons, or adequate haulage facilities. A dockers' dispute at Greenock, which is now happily over, further complicated the situation. This week traffic at the harbour is moving with greater freedom.

### Repair Work.

Repair and overhaul work continues brisk on the lower reaches of the river, but there is only a moderate amount of work in hand at Glasgow. James Lamont & Co. have three vessels undergoing repairs at Greenock, one being a tug, another a coasting steamer, and the third a sailing vessel, the last mentioned ship having been dry-docked this week. George Brown & Co. have been engaged in repairing a trawler in the Garvel Dry Dock. Another repair job which will shortly be undertaken, probably at Greenock, is that of the steamer *Pontop* which recently sustained damage to the hull. This vessel was dry-docked last week for survey, and it is understood the tenders are now out for her repair. The vessels undergoing overhaul at Glasgow include the locally owned steamer *Katherine Park*, a City liner, and a Clan liner.

## THE NORTH-EAST COAST.

(From Our Own Correspondent.)

**Newcastle-on-Tyne.**

The figures available of commercial tonnage output show that two vessels of 5,691 tons (the ss. *Madryn*, of 2,260 tons gross, building by Osbourne, Graham & Co., of Hylton ; and the *Dorisbrook*, 3,431 tons, building by J. Blumer & Co., of the North Dock Shipyard) were launched on the Wear last month. This total compares with 8 vessels of 33,037 tons launched in October last year. The total output from the Wearside yards for the 10 months of this year is 29 vessels of 99,139 tons as compared with 59 vessels of 238,786 tons, launched in the same period of last year. In common with other districts, recruiting has once again actively revived as a result of His Majesty's appeal, and the letter from Lord Derby. Athough the men employed at practically all of the leading shipbuilding and marine establishments are understood to be immune from enlistment, yet it is generally understood that there is destined to be a further depletion in the men engaged in these branches of industry and the productive capacity for purely commercial tonnage is therefore likely to be further lessened.

### Ship-Repairing.

Several of the dry docks have been vacant on two or three days recently, and ship-repairers are now only moderately engaged, so that owners will have no difficulty in getting quite early turns for any work sent into the district. The ss. *Hunterfield*, belonging to Love & Stewart, Ltd., the managing owners for the Lovart Steamship Company, Ltd., Glasgow, is in Brigham & Cowan's 400-ft. dry dock at South Shields undergoing considerable bottom damage repairs. The Tyne Dock Engineering Company have the collier *Limehouse* in dock for painting and repairs. The Middle Dock & Engineering Company, Ltd., South Shields, have in hand the ss. *Beneficient* and the ss. *Magnus Mail*, both belonging to James Westoll, Sunderland, whilst alongside, on Monday, were the steamers *Banta*, *Blus*, *Lucent* and *Sola*. John Readhead & Sons, Ltd., are still occupied with the heavy repairs to the ss. *Lotusmere* and the ss. *William Balls*. Adjoining, at South Shields, Smith's Dock Company, Ltd., have in hand a C.T. boat and the ss. *Soldier Prince*. At North Shields, Smith's are still employed on the heavy fire damage repairs to the ss. *Samui*, and the overhauling of the 8,600-ton d.w. oil-tanker *Bulysses*, of the fleet of the Anglo-Saxon Petroleum Company, Ltd. There has just recently been undocked at the Bull Ring Docks, South Shields, the new Russian steamer *Kaminitz Podosk*, whilst at their No. 8 dock this firm is now dealing with the Greek steamers *Mikra Assia* and at the pontoons with the *Marie Z. Mikachalinos*, both for heavy repairs.

## SOUTH WALES NOTES.

(From Our Own Correspondent.)

**Cardiff.**

Despite a continuance of poor tonnage arrivals and the work lost by the withdrawal of Greek vessels from the market local ship-repairing concerns are much busier, and a number of heavy jobs are in hand. Employers are finding increasing difficulty in obtaining sufficient labour to cope with their requirements. A large number of dry dock workers have had war badges issued to them, but even so employers find it a hard task to get sufficient workers for their needs. The Cardiff Channel Dry Docks & Pontoon Company, Ltd., are well engaged with heavy repairs to the steamer *Neebing*, which includes the fitting of a new rudder post. The Mountstuart Dry Docks, Ltd., are fully employed renewing about 15 plates on the port quarter of the steamer *Vitruvia*, which was damaged through a collision with the Greek steamer *Driskos* at the entrance to the Cardiff Docks. The steamer *Woodbridge*, on which Hills' Dry Docks & Engineering Company, Ltd., recently completed particularly extensive damage repairs, is also in the hands of the Mountstuart Dry Docks, Ltd., for repairs to damage sustained through being in collision, while the steamer *Querida* is being fitted with a fire extinguisher, and the steamer *Twilight* is having heavy bow damage repairs attended to. Elliot & Jeffery are still busy with general repairs and survey work on the steamers *Grigorios Anghelatos* and *Kardamila*, while T. Diamond & Co. will be engaged for some little time with extensive bow damage repairs to the steamer *Cardiff Hall*. The Barry Graving Docks & Engineering Company are repairing bottom damage to the steamer *Tresillian* and *Kalibia*, and are busy with general work on the steamers *Glenaffric*, *Cressington Court*, *Fairhaven*, *Inchmoor*, *Banchory* and *Mozart*, besides completing extensive bottom and deck repairs to the steamer *La Fontaine*. Swansea, Newport and Port Talbot are busy with minor repairs to a comparatively large number of vessels. John Shearman & Co., Ltd., are working on 20 steamers at Cardiff, Penarth and Newport, amongst which are overhauls to the steamers *Tandil*, *Globe* and *Fridalen*, and general repairs to the steamers *Girda*, *Glena*, *Armora*, *Holmpark*, *Goldennis*, *Antoricos Embiricos*, *Njaal*, *Solway Prince*, *Ardgarry*, *Vaering*, *Margarita*, *Johannes Maersk*, *Sutherland Grange*, and *Vinland*.

## MERSEY SHIPPING AND SHIPBUILDING.

(From Our Own Correspondent.)

**Liverpool.**

An item of outstanding interest in shipping circles here just now is the scarcity of tonnage to carry on the country's oversea trade, and the misuse to which the large number of ships are being put that have been requisitioned by the Government. What is keenly awaited is the course of action which the Board of Trade will take in this matter. Many shipowners have been giving their views on the Government's methods of employing the ships they have requisitioned, and these may be summed up as proving conclusively that the chartered tonnage is not being used to the best advantage. Sir Norman Hill holds the opinion that by careful management it would be possible for the Government to release some of the vessels now used as transports. If, however, this cannot be done to the extent of fully maintaining the nation's needs from oversea, then there is only one alternative left, and this Sir Norman Hill declares is for the Government to prohibit the importation of all articles

which are not of vital importance to the nation. Such a remedy must cause a certain amount of inconvenience and suffering, but, he adds, it would be immediately effective.

Sir Norman Hill has likewise expressed concern lest the present recruiting campaign should react detrimentally on the mercantile marine. The upkeep of which is so necessary to our national well-being, but an important decision has just been arrived at on this point. All dock labourers and dock carters who enlist are now to be put on reserve.

### Mersey-Scandinavian Service.

At the end of this week, T. B. Stott & Co. will inaugurate a new cargo service from the Mersey to Gothenburg, Copenhagen and other ports in West Sweden. The loading berths are at Liverpool and Manchester, from the latter of which the first sailing will be made on Saturday, and thereafter about every 10 days. The steamers to be employed are the *Mabs*, *Dalecarl* and *Eastern*.

### The Allan Line.

Particulars are now available about the purchase of the Allan Line by the Canadian Pacific Railway Company. The latter company have sold to the Canadian Pacific Ocean Services, Ltd., its 57,637 £10 fully-paid shares in the Allan Line for an equivalent sum in shares of the new company, and its fleet of 17 steamers for another £4,252,400. The latter sum is to be satisfied by the allotment to the Canadian Pacific Railway of 138,654 fully-paid £10 shares of the Canadian Pacific Ocean Services, Ltd., and £2,865,860 5 per cent. first debentures, or debenture stock. Of the £2,000,000 of share capital of the new company, the Canadian Pacific Railway therefore holds £1,962,910.

### Dublin Dockers and the Cattle Trade.

The first effect of the dockers' strike at Dublin has been a partial suspension of the Irish cattle trade to Birkenhead. There is, however, one service being maintained, that of the Tedcastle Line, which has been able to arrange terms with their dockside workers.

I recently recorded that several more dockers' canteens were to be provided, and the sites of these have been decided upon. Besides the "khaki" canteen at Bankhall, there are to be six additional ones provided, three at the south docks, three at the principal north-end docks, while a well-known shipowner is erecting one on the Birkenhead side of the river.

The Mersey Docks and Harbour Board have accepted a recommendation of the Docks and Quays Committee to equip a portion of the Brocklebank branch dock shed with electric cranes.

## ORDERS PLACED.

The Cunard-Anchor Line has placed an order for two geared turbine passenger steamers with A. Stephen & Sons, Ltd., Glasgow. Further particulars are given in a note on page 385.

According to a report from Madrid, the Gomez Shipbuilding Yard at Valencia has secured an order from South Wales for the construction of two 1,300-ton steamers.

## MANUFACTURING AND INDUSTRIAL NOTES.

The Russian Volunteer Fleet has opened offices at 44, Whitehall Street, New York, in charge of Mr. Ivan Shestakofsky, managing director. This Russian organisation will maintain thereafter a weekly cargo service from that port to Archangel. The Volunteer Fleet conducted a cargo and passenger service from this port to Rotterdam and Libau from 1906 to 1909. The new service will be additional to one between Vancouver and Vladivostock.

Sydney (N.S.W.) newspapers state that the tender of Poole & Steel for the construction of three lighthouse steamers, approximately £50,000 each, was accepted by the Federal Government some months ago. The contract provides for their completion in about 14 months. The vessels are to be used for lighthouse work by the Commonwealth. Although several months have elapsed since the tender was accepted, it is said that construction of the vessels has not yet begun.

In the matter of rapid construction of new buildings during war time, the Engineering Department of the Port of London Authority has recently provided a somewhat striking example by erecting at Tilbury in the short space of 45 days, for the use of the Government, a large steel shed on pile foundations, with brick division walls and loading platforms, besides extensive railway sidings alongside. The shed, in extent, is capable of accommodating 15,000 tons.

## THE COAL MARKETS.

(From Our Own Correspondents.)

There is little to suggest any pronounced improvement in the condition of the South Wales coal market for some little time to come. It is true that last week there was, generally speaking, some improvement in chartering, but it is admitted on all hands that much more improvement must come along before the market receives the stimulus it requires. Tonnage supplies have been far from satisfactory and a good many more ships will be needed to keep the collieries going. The advance of outward freight rates to Mediterranean ports indicates the demand for tonnage. On all hands the opinion is expressed that action by the Government is imperative in order to augment the supply of tonnage and, what is equally important, keep freight rates within something like reasonable limits.

There was a fairly steady market at the opening of the week for dry large. Smalls were depressed and holders of these in some cases were unable to secure within 2s. or 3s. of the quoted price. Second Cardiff large steam were quoted approximately at 18s. to 19s., and ordinary large steam at 17s. 6d. to 18s. Best drys stood at 23s. to 24s., Western Valleys at 17s. 6d. to 18s., and best classes of Eastern Valleys at 17s. to 17s. 6d. Pitwood stands at 46s. to 47s.

### North-East Coast.

The buoyancy which characterised the Tyne coal market in the latter days of October has passed, but it cannot be said that the market is in a worse position than it was at the close of last week. Tonnage shortage, of course, continues to be a dominating factor in the position. Turns are reported to be full for the present week, but through the non-arrival of expected vessels business here and there has become disorganised. Generally, a good demand prevails and the collieries are maintaining full recent quotations. Tyne primes, on Monday, stood at 18s. 6d. to 19s., and second Tynes were held at 16s. 6d. to 17s. A shade easier feeling was in evidence in regard to North Northumberlands, which were quoted at 18s. 6d. Unscreened steams for bunkers were obtainable at 16s. 6d. In second hands Durham coals were slightly easier. Through merchants best gas coals could be secured at 19s. 6d. and Wear specials at 21s. Durham bunker coals were steady at 16s. for ordinaries and 1s. to 1s. 6d. for best sorts. Best foundry coke was quoted at 28s. to 35s., and gas house coke at 30s.

### The Scottish Markets.

During the past fortnight there has been a continuance of the improvement in the Scottish coal market. There has been a good demand, and some tendency towards enhanced prices. The West of Scotland market has put through a good volume of business, and named ells have increased in value. For shipments ahead collieries are reported to be well booked. For early positions there is some difficulty in obtaining named ells. Prime quality splints are well stemmed. Navigations are being freely dealt in, a good volume of business being reported. Steams are somewhat easy. Approximate quotations for the West of Scotland include:—Ell (best), 18s. 3d. to 18s. 6d.; ell (ordinary), 17s. 6d. to 18s.; splint (best), 22s. 6d. to 24s. 6d.; splint (ordinary), 18s. to 18s. 6d.; and navigation, 19s. to 21s. 6d. In the Fifeshire section screened navigation is quoted at 20s. 6d. to 21s. 6d., with unscreened at 2s. less. First-class steams stand at 18s. to 18s. 6d., and third-class steam at 14s. to 15s. Quotations for Lothians include:—Best steams, 17s. 6d. to 18s.; and ordinary steams, 16s. to 16s. 6d.

### London Business.

On the London Coal Exchange there has been much complaint from merchants arising out of the continued delay in delivery of ordered house coal. There has been no very great amount of new business, the comparative dullness of the retail trade holding the demand in check. Firmness characterises the tone for rail-borne coal and the prices have been governed—at all events, in most cases—by the Limitation Act. Owing to the high rates of freight the usual seaborne house coal is being brought on the rail in moderate quantities. Supplies, however, are mainly restricted to Yorkshires or secondary qualities. Steams practically all round have been firm, and great difficulty has been experienced by buyers in securing them.

### Position at Genoa.

According to advices from Genoa the market is very unsettled. There are large stocks of coal in the port, but the intimation that

shipowners are chary on coming to Genoa is having the effect of stiffening prices. Not many charters have been effected of late. There is a considerable inquiry for coals for early November loading. Especially are Cardiff coals in request, although buyers rather shy at the level of prices asked by shippers. For Admiralty seconds 65s. is quoted, but for coals of this class in port definite business has been done at 64s. There is practically no change in the range of prices of anthracite, stocks of which are rapidly diminishing. North country gas coal is in demand and probably 64s. or 65s. would be paid by would-be purchasers for New Pelton-Holmside.

## THE FREIGHT MARKETS.

(From Our Own Correspondents.)

**London.**

It is difficult to suggest how far freight rates will continue to advance. The rise in rates has continued during the past week and fixtures have been concluded at very high figures. As indicating the shortage of tonnage in Indian waters it need only be said that Karachi and Bombay charterers have been obliged to take up tonnage at a rate which is about 12s. 6d. higher than the rate prevailing three weeks or less ago. A more steady tone exists in the Plate section. Rates from this district are not as high by about 2s. 6d. as they have been, but the general view is that more business will be coming along for after-Christmas loading. The *Gledhow*, 32,000, 10 per cent., has been fixed at 77s. 6d. to the United Kingdom for January 15 loading. From the West Coast of Africa a number of small steamers have secured 85 fr., for Bristol or Bordeaux, with ground nuts, and further boats could be placed for this business. There is a little less animation in time chartering. Tonnage has, however, been fixed for 12 months transatlantic trading at 17s. From the Northern Range tonnage for grain loading is in demand, with good figures offering. The *Upo Mendi*, 25,000, 10 per cent., gets 15s. to West Italy, and this could be repeated. From the Northern Range to Tyne, Sunderland or Leith, the *Diadem*, 23,000, 10 per cent., has 13s. 6d. There is an increasing demand for vessels to load heavy grain to French Atlantic ports, and for this business 14s. is offered. Baltimore to London, with oats, has been closed to the *Elswick Lodge*, 40,000, 10 per cent. The *Burcombe*, 5,800 tons, has secured 60s. from Karachi to the United Kingdom, part cargo of barley guaranteed, net terms. The high rate of 67s. 6d. has been paid for a 6,100-ton steamer from Bombay to Hull. For homeward loading from Australia the *King Idwal* and *Queen Maud* have been taken up at 95s. From the Tyne for outward coal loading very high rates still prevail. Recent fixtures are:—St. Vincent, 32s. 6d.; Leghorn, 49s. 6d.; Dunkirk, 21s.; Genoa, 48s.; Rouen, 21s.; and London, 10s. 6d. There is more activity in the Cardiff market. Recent fixtures include:—Havre, 15s. 9d.; Barcelona, 37s. 6d.; Marseilles, 55 fr.; Malaga, 32s.; and Bizerta, 48 fr. Swansea to Gandia has paid 33s. 6d., and from Hull a sailing vessel of 700 tons has 25s. to Christiania with furnace coke.

**Cardiff and Swansea.**

The acute scarcity of tonnage which has been one of the predominant features of the freight market during the past month is testified to by the fact that altogether vessels of a total carrying capacity of 656,250 tons were fixed to load at Cardiff or Newport last month, compared with 1,777,600 tons and 1,865,880 tons in October of 1913 and 1914. Vessels chartered to load at Swansea or Port Talbot totalled 185,600 tons against 253,070 tons and 220,420 tons in October of 1913 and 1914 respectively. Since our last report chartering at Cardiff has been fairly brisk, tonnage to carry 173,620 tons being fixed or 34,140 tons more than in the previous week. For the Mediterranean the inquiry was brisk and of an urgent character while tonnage offers were below requirements, with the result that rates maintained a very firm tone and several new high records were created. Algiers was done at 47 fr. (twice) and 47½ fr. (a new high record); Bizerta, 48 fr.; Bilbao, 19s.; Barcelona, 37s. 6d. (six—a new high record) and 37s.; Cagliani, 43s. 9d.; Genoa with options, 45s. (four—a new high record); Lisbon, 23s. 6d. and 24s. 3d.; Malta, 40s.; Malaga, 32s.; Marseilles, 53 fr. (twice), 50 fr. and 55 fr. (twice—a new high record); Naples or Torre Annunziata, 41s. 6d.; Port Said, 48s. (twice—a new high record); Seville, 28s. 6d.; Tarragona, 32s. 6d., 33s. 3d. (twice) and 33s. 9d.; and Valencia, 31s. 6d., 32s. 3d. (twice), and 33s. 9d. Bay and coasting business was limited by a restricted demand and rates displayed a rather weaker tone, Brest fixing at 14s. and 13s. 3d.; Bordeaux, 31 fr. (seven—a new high record) and 30 fr. (three); Havre, 15s. 6d., 16s. (a new high record) and 15s. 9d. (twice); Nantes, 28 fr. and 28½ fr. (twice); Rouen, 17s. 6d. (seven) and 17s. 3d.; and St. Nazaire, 29 fr. (a new high record) and 28¼ fr. South American chartering was slow and with the demand limited rates were barely upheld on the basis of Bahia Blanca, 42s. 6d. (a new high record); Monte Video, 37s. 6d. and 38s., and River Plate, 40s., 39s., 39s. 6d., and 38s. 9d.; while Eastern business was confined to Aden, 49s. 6d. (three); and Colombo at 49s. 9d. (a new high record). Tonnage to carry 36,540 tons was fixed to load at Swansea or Port Talbot, or 8,520 tons more than in the preceding week. Rates for the Mediterranean ruled firm at Gandia, 33s. 6d.; Naples or Torre Annunziata, 42s. 6d.; and Valencia, 31s. 9d.; while for other directions rates were steady at Bordeaux, 31 fr.; Havre, 16s. 3d. (a new high record) and 16s.; Rouen, 17s. 3d.; (twice), 17s. 9d. (twice), and 17s. 6d. (four); and St. Malo, 13s. 9d.

**Glasgow.**

Markets have been strong all round since our last report and increased rates have been paid for early boats. Coals from Wales to the River Plate were reported to have paid as high as 39s., but this rate receded later to 37s. 6d., owing mainly to a rise in homeward rates from that quarter. More than the average number of fixtures have been reported during the week in the short voyage trades, and rates ruled high. The following were among the transactions reported:—Glasgow to Havre, 600 tons, 19s.; Glasgow to St. Nazaire, 1,800 tons, 29·50 fr.; Ayr to Genoa, 3,200 tons, 43s.; Methil to Rouen, 1,700 tons, 21s.; Glasgow to Bordeaux, 2,500 tons, 32 fr.; Glasgow to Rochefort or La Pallice, 1,600 tons, 30·50 fr.; Glasgow to Genoa, about 43s. Coal rates to the Mediterranean were also firm, up to 45s. being paid to West Italy, 40s. to Malta, and 48s. to Port Said, while 49s. 6d. was paid twice for Aden. Homeward markets from America and the River Plate were steady, although in the end there was little sign of a further upward tendency. Generally speaking the advance in rates from the Plate was from 77s. 6d. to fully 85s. for November, while 75s. was offered for January-February boats. In the Eastern markets, business was said to have been done from Calcutta at the enhanced rate of about 85s. 6d. jute basis, while Bombay quoted 65s. to 70s to the United Kingdom for early tonnage. A Glasgow vessel was fixed for case oil to the Far East on the basis of 72 cents. to Hong Kong. Australia was steady at 95s. for wheat home.

**Newcastle-on-Tyne.**

Great firmness of rates has characterised the freight market during the past week and very substantial increases are to be recorded for nearly all destinations. Shippers are pressing for tonnage but boats are arriving very irregularly, and it is anticipated that an even greater shortage of boats will be shortly in evidence. It is complained that a considerable amount of tonnage has been diverted from the East Coast to South Wales, where bunkers can be obtained at bargain prices. Coastwise, business has been done on the unchanged basis of 10s. to London. Record rates have been paid for North France, and Rouen is worth up to 21s., an advance of 2s. on the week, whilst Dunkirk has paid a similar figure. Not a single fixture has been arranged for the Bay but quotations rule fully equal to recent rates. Though Genoa has been fixed for at the unprecedented rate of 48s., some Mediterranean destinations are easier, Algiers having been done at down to 31s., a decrease of 4s. on the week, and Oran at proportionately reduced prices. At the time of writing, however, the tone is fully firm. Fixtures arranged since last report include the following:—Algiers, 3,500, 32s. 6d.; 2,400, 31s.; Barcelona, 2,500, 37s. 6d.; Bagnoli, 4,000, 43s.; Calais, 1,400, 20s.; Caen, 500, 19s. 6d.; Dunkirk, 500, 25s. 6d., coke; 350, 18s. 6d.; 1,100, 20s.; 2,000, 21s.; Dieppe, 4,000, 19s.; Gibraltar, 1,800, 29s.; 2,500, 18s. 6d.; Genoa, 1,700, 46s. 6d.; 3,000, 47s. 6d.; 2,700, 48s.; Havre, 500, 25s.; coke; London, 1,800,10s.; Marseilles, 3,000; 41s. 6d.; 3,500, 41s.; Malaga, 2,000, 35s.; Naples, 4,000, 45s.; Oran, 2,000, 31s. 6d.; Porto Ferrajo, 4,000, 43s.; Rouen, 500, 26s., coke; 1,900, 19s. 6d.; 2,200, 20s.; 1,700, 20s. 6d.; 1,800, 20s. 9d.; 1,800, 21s.; Toulon, 1,200, 40s.; Tarragona, 2,000, 37s. 6d.

**Liverpool.**

The scarcity of tonnage is becoming more pronounced on this market, both for outward and homeward employment. Hence there is only a restricted business being done at rates which are generally speaking, firm all round. Among the few local outward engagements are Manchester to St. Nazaire at 25s. and Liverpool to Alexandria at 40s. Coal freights outward are firm, and only part cargoes in the main from the Mersey coaling centres are reported. There is still a steady inquiry for time charter tonnage and rates are

outstanding 12 months' engagements in the transatlantic trade, being now worth 21s., while 21s. is fixed coloured in the Australian trade. Japan has also fixed several ships at 12s. 6d. and 13s., exclusive of war risks insurance. In the homeward trades there is a scarcity of tonnage in the River Plate trade, and freight shows values from 90s. to 85s. from up river. North America is still an active market for grain with slightly better rates. Northern Range paid 12s. 6d. to 13s. to United Kingdom, 13s. 1½d. to Marseilles, and 15s. one port West Italy. Cotton, coals, and other cargoes are neglected, at rates now ruling. Eastern markets are generally firm, and more doing. Australia holds to 95s. for Jan.-Feb., and India firm with 85s. on deadweight, paid Calcutta to United Kingdom, and 57s. 6d. from Karachi. Bombay offers 65s. on deadweight to United Kingdom. Mediterranean and ore ports are quietly steady, and Hudson Bay to Continent closed at 17s. North Pacific is a firm market, and offers up 120s. to United Kingdom via the straits of Magellan. Coal freights are firm homewards, though business is slow. North Pacific to United Kingdom has paid 100s. end of December, while outward to Las Palmas with coals made 21s., and to River Plate, 50s.

**Hull.**

The market has a very firm tone with tonnage still on the scarce side, and rates in every section of the market are on a very high level. In the Mediterranean direction rates are based on the remarkable level of 49s. for Genoa from Hull and 47s. 6d. for Alexandria from Hull, but at these high rates business is slow to mature. In the shorter trades 10s. rules for London from Hull, 19s. 6d. to 20s. according to size for Rouen from Hull, 19s. to 19s. 6d. for Honfleur or Fécamp from Hull, and 19s. to 19s. 6d. for Dieppe or Havre from Hull. The demand for tonnage to Rouen is quieter, but there is a better demand for boats for Dieppe and the usual group of North French ports. Licences are being granted without delay for French destinations, and a few for Scandinavian ports. For a coke cargo a sailing ship of 700 tons was fixed for Christiania at 25s.

## COMPANY REPORTS.

**Nitrate Producers' Steamship Company, Ltd.**—Interim dividend at the rate of 10 per cent. per annum, free of income-tax, on the ordinary shares for the half-year.

**India General Navigation & Railway Company.**—Interim dividend of 4 per cent. on the ordinary shares, free of tax, payable on November 23. A year ago the dividend was 2½ per cent.

**Ariadne SS. Co., Ltd.**—The directors recommend a dividend of 40 per cent. for the year. The profit on the year's trading is £25,854, including £207 brought forward from last year. Dividends absorb £8,854, £16,500 is put to the sinking fund, and £500 carried forward. The directors state that taxation has been too heavily increased and the effect of the excess profits taxation is restricting funds available for new tonnage. Any excess war profits should only be charged on the dividends distributed and not on all profits, including sums put to reserve and depreciation.

**Orders & Handford SS. Co. Ltd.**—The report for the year ended October 31 shows net profits £64,477, which with the balance brought forward from last year makes a total of £66,442. The directors recommend a dividend for the year of 20 per cent. writing off £20,000 from capital account, £4,000 off investments and setting aside £20,000 for war taxes. The carry forward to next account is £3,342. Five of the Company's steamers have been on charter to the Admiralty since the beginning of the war and the directors state that they have not had much opportunity of benefiting by the high freights ruling.

**Liverpool & North Wales Steamship Company, Ltd.**—The report states that, owing to the requisition of certain of its steamers by the Government, it was impossible for the company to conduct the usual passenger service to and from Liverpool, Llandudno and the Menai Straits, and consequently this service had to be abandoned. The company's steamers *Snowdon* and *St. Trillo* were placed upon the North Wales station, and were employed during the season sailing to and from Colwyn Bay, Llandudno and the Menai Straits. After deducting the sum of £6,255 for depreciation on steamers, the amount available for dividend and other purposes, including the balance brought forward from last year, is £5,485, out of which the directors recommend a payment of 6 per cent. dividend (less income tax), carrying forward a balance of £1,663. The 500 mortgage debentures of the company, which fell due for repayment on January 1 last, were renewed for a further extended period, and the directors have pleasure in reporting that applications were received for 422 out of the total 500 offered, leaving a balance of 78 debentures still unplaced. Having regard to the unsettled state of the money market at the date when these debentures were re-issued, the response received may be considered as a very satisfactory one.

**London Maritime Investment Company, Ltd.**—The report for the year ended September 30 shows net profit of £18,612, to which must be added £1,034 brought forward, making £19,646. Of this, the dividend upon the preference stock absorbs £7,747, and after adding £1,533 to the reserve fund (in addition to £967, credit balance on change of investments during the year), the directors recommend that for the half-year ended September 30 a final dividend upon the ordinary stock of 6 per cent. per annum, less income-tax (making 6 per cent. for the year), be declared, and that the balance of £1,200 be carried forward.

**City of Dublin Steam Packet Company, Ltd.**—The report for the half-year ended August 31 states that no casualty of importance occurred to any of the company's vessels during the half-year. On March 5 the directors were informed that the Admiralty proposed to requisition two of the mail packets under Royal Proclamation for Government service. One of the managing directors proceeded to London, and pointed out that it would be impossible to carry on the mail service should the Lords Commissioners of the Admiralty adopt such a course, and they then decided to requisition one only, and the *Connaught* was subsequently taken over. It was fully explained that under the terms of the postal contract the company is obliged to supply four mail steamers, and to carry on the contract with three would be a matter of extreme difficulty. The Admiralty recognised the position of the company, and have undertaken the entire responsibility for any adverse effect the requisitioning of the *Connaught* might have on the mail contract. The *Wicklow* has been supplied with new boilers by the Clyde Shipbuilding & Engineering Company, and in the circumstances her survey was done when the boilers were being put on board. She has resumed her place on the station, and is in perfect condition. Early in the half-year further demands were made by the crews of the company's vessels, and the directors agreed to give the same increases as were given by other companies; a similar increase was given to the shore staff, and the matter was supposed to be settled. However, in July, the crews of the cargo vessels made further and unreasonable demands; the Munitions Act having been passed about the same time empowered the Board of Trade to settle any dispute, and enforce the terms of an arbitration, the company acquiesced in the matter being so dealt with, but as the arbitration did not take place during the half-year reference to the subject is postponed. Owing to the enormous increase in expenses, in particular the premiums to cover war risks on the vessels, the profits on the cargo service have been greatly reduced; the mail service has been well maintained; in consequence of the closing of some of the cross-Channel routes, the mail passenger traffic has increased, but, as mentioned in the last report, the company's share of the receipts is not commensurate with the volume of traffic, and the negotiations with the London & North-Western Railway Company on the subject are still proceeding. After providing for the interest on the mortgage loan, the mortgage loan sinking fund, the guarantee to the City of Dublin Junction Railways, the balance at the close of the half-year, including £8,706 brought forward from the previous half-year, was £29,803. Of this the directors have placed £6,400 to the renewal fund of the trading steamers, and £5,000 to the reduction of compensation to the shipbuilding shareholders, leaving a balance of £18,403, out of which the directors recommend the payment of a dividend at the rate of 5 per cent. per annum (less income-tax) on the 5 per cent. cumulative preference stock, and a dividend at the rate of 4 per cent. per annum (free of income-tax) on the ordinary stock, carrying forward a balance of £6,046 to the next account. The war risk insurance on the mail steamers is very heavy. In olden days this risk was taken by the Post Office, and did not fall on the contractors; when in the year 1839 the Post Office reverted to the system of contracting for the carriage of mails by sea such a risk was not thought of, and, although the Post Office now admit that this was the case when the present mail contract was entered into in the year 1895, they have so far declined to relieve the company of any part of the charge.

## NEWS PARAGRAPHS.

**I.N.A. Transactions.**—Vol. 57 of the Transactions of the Institution of Naval Architects is now ready for issue.

**The Bureau Veritas.**—The address of the Bureau Veritas, Paris, is 31, Rue d'Offémont, Paris (XVIIe), as from November 1.

**The Panama Canal.**—Turner, Davidson & Co., Ltd., received last week-end the following cable:—"Have reliable information that, provided no further large movements, some chance passage for steamers now here three weeks, but cannot guarantee this."

**Officers to Stick to Their Ships.**—The Imperial Merchant Service Guild have received a communication from the Admiralty stating that those certificated mercantile marine officers who are ineligible for the Royal Naval Reserve, are serving their country in the best way in the present crisis by remaining in the mercantile marine.

**Damages for Alleged Slander.**—At the Liverpool Assizes on Monday, C. & H. Crichton, Ltd., shipbuilders and engineers, were awarded £50 damages in an action for alleged slander against T. G. McKay, Manager of the British Arc Welding (Mersey) Company, Ltd., for wrongly imputing that C. & H. Crichton, Ltd., had a German connection.

**Proposed Vladivostok-Vancouver-San Francisco Steamship Line.**—In order to develop Russian-American trading, the Russo-American Chamber of Commerce in Moscow has applied to the Merchant Marine Department and to the Board of the Volunteer Fleet, Russia, for an extension of the line of the latter concern thus:—Vladivostok-Vancouver, and as far as San Francisco.

**Rapid Discharge in the Port of London.**—An instance of rapid despatch in the discharge of vessels laden with maize in bulk in the Port of London has just been furnished by the Millwall Docks, where the ss. *Globe*, with a cargo of 5,718 tons, was discharged in 28½ working hours. The vessel commenced her discharge in the afternoon of October 20 and completed it early in the morning of October 23, the output of cargo being at the rate of about 200 tons per hour.

**The "Germania" Condemned.**—Sir Samuel Evans, in the Prize Court, has condemned the Krupp-owned yacht *Germania*, together with *Lasca II.*, *Stella Maris* and *Paula III.* The Solicitor-General said the Crown asked to have the ship condemned as a prize of war. It was suggested by the claimant that she was not a vessel of commerce, as dealt with at the Hague Convention, and that she was of no naval or military value. As to the latter, said counsel, that was ludicrous. She could sweep mines.

**Steel Makers' Acquisition.**—An important combination of interests has just been made in connection with a section of the Scottish steel trade, which will doubtless result in a greatly increased output from a steel-making establishment on the outskirts of Glasgow. David Colville & Sons, the well-known Motherwell firm, have acquired the whole of the ordinary shares of the Clydebridge Steel Company, Ltd., whose works have hitherto produced only plates. The Clydebridge Works, which have been closed temporarily for repairs to machinery, will be opened shortly for the manufacture of material to the order of the Government.

**British Wrecks Reported in October.**—The number and net tonnage of British vessels respecting the loss of which reports were received at the Board of Trade during the month of October, 1915, and the number of lives lost, are as follows:—

| Description. | Number. | Net Tonnage. | Lives Lost. |
|---|---|---|---|
| Sailing .. ... ... ... ... | 22 | 2,879 | 35† |
| Steam ... ... ... ... ... | 33 | 39,092‡ | 66§ |
| Total .. ... ... | 55 | 41,971 | 101 |

* Including 1 sailing vessel of 277 tons sunk by a German warship and 1 sailing vessel of 25 tons sunk by a mine.

† Including 3 lives lost in a sailing vessel sunk by a mine.

‡ Including 7 steamers of 19,067 tons sunk by German warships, 3 steamers of 4,215 tons sunk by mines, and 1 steamer of 1,165 tons sunk by a German warship or a mine.

§ Including 8 lives lost in steamers sunk by German warships and 9 lives lost in steamers sunk by mines.

The figures include the losses of 11 sailing vessels of 1,157 tons and 8 steamers of 5,767 tons belonging to British possessions abroad, involving the loss of the lives of three persons, all of whom were lost in sailing vessels. Casualties not resulting in total loss of vessels, and the lives lost by such casualties, are not included.

**American State Steamers.**—A Reuter message from Washington states that the new Government Bill to provide the United States with naval auxiliaries in war time, and for the upbuilding of its foreign trade in times of peace, contemplates the appropriation of $50,000,000, and the establishment of a shipping board, to include the Secretary of the Navy, the Secretary of Commerce, and three other members selected by President Wilson. The Board would be empowered to organise a corporation or corporations to establish steamship lines, which could either operate ships or lease them to other parties. The members would also have authority, acting in conjunction with the Inter-State Commerce Commission, to arrange for through bills of lading by rail and steamship lines to foreign ports, and for special through rates, so that American railroads and steamships might meet foreign competition in the markets of the world. The measure it is announced, has been so framed as "to encourage and develop a great merchant marine under the American flag." A similar Bill, in its essential features, failed to pass Congress last year.

**Argentine Coasting Trade Regulations.**—The *Boletin Oficial* (Buenos Ayres) of September 11 publishes the text of a Bill to regulate the coasting trade of Argentina. Under the provisions of the proposed law, which, if passed, will replace Law No. 7,049, of 1910, coasting trade can only be carried on by vessels registered under the Argentine flag, as under the existing law. Article 2 of the Bill authorises the executive power to grant bounties, within the sums annually fixed in the Budget, to naval construction establishments and to navigation companies organising regular coastal services in the Republic. With a view to giving greater facilities to river commerce between Argentine coast ports and near ports in the neighbouring countries, the executive power is authorised to accord, on a basis of strict reciprocity, privileges in connection with the loading and unloading of vessels occupied exclusively in the coasting trade. Foreign vessels found carrying on coasting trade will be fined from 2 to 6 pesos gold (8s. to £1 4s.) per registered ton. Every effort will be made to secure harmony between the working of the coasting trade services and the railway system, with a view to avoiding the establishment of disproportionate tariffs.

**Ships Held up by the Canal Slide.**—Up to October 5, there were 83 vessels tied up in the Panama Canal, awaiting passage. Of these, 45 were on the Atlantic side, with an aggregate of approximately 167,000 tons of cargo, and 38 were on the Pacific side, with approximately 189,000 tons of cargo. The vessels waiting on the Atlantic side are, according to the *Canal Record*, the *Newburn, Strathearn, Oliver J. Olson, Rio Pirahy, Tallac, Acajutla, Saint Ursula, Maritime, Earl of Douglas, Strathesk, Nebraskan, Tenzan Maru, Themis, Wellington, Saint Leonards, City of Colombo, Ranella, J. L. Luckenbach, Rauma, Tuscan Prince, Strathendrick, Arizonan, Clio, Iouran, Barrowmore, Iroquois, Naraha, Masunda, Quiriri, Corfu, Magellan, Pentwyn, Eureka, Baron Candor, Rionar, Santa Cecilia, Taurus, Musician, Harperley, Finland, Darnholme, Sverre, Strathbeg, Terrier, Polyphemus.* The vessels waiting on the Pacific side are, in the order of their arrival, the *Newport, Poleric, Llandudno, Flamenco, Clan Alpine, Sultana, Hackensack, Rondo, Amista, Huallaga, Vinstra, Devian, Morazan, Tenpaisan Maru, Mars, Edith, Ohioan, Olson and Mahony, Admiralen, Santa Catalina, Trader, Discoverer, Ortega, Iquitos, River Forth, Hammershus, Benedict, Manchester Civilian, Alban, Alaskan, Machaon, Strathairly, Aboukir, Grahamland, Victoria, Korea, Kentra.*

**Steam Trawling in Japan.**—According to a recent Consular report dealing with the trade of Nagasaki, since its inauguration in 1907 the steam trawling industry of Nagasaki has shown quite successful results. At the outset it seemed that the twin ports of Shimonoseki and Moji, thanks to their advantages of cheap coal, superior railway service and, more important perhaps, their proximity to the populous centre of Japan, would oust Nagasaki as the trawling base for this part of the Empire. These advantages, however, have been to a large extent counterbalanced by the restrictions placed on fishing areas by the Government as the result of vigorous protests on the part of the old style fishermen. Frequent damage to submarine cables has led to further restrictions, so that Nagasaki is now nearer than its rival to the available fishing grounds, and many of the trawlers are in consequence transferring their base to Nagasaki, where the local authorities are doing all in their power to improve the facilities for landing and marketing. During the past two years, also, the capacity of the local ice factories has been extended, and two new factories established, the machinery being

mostly imported from the United Kingdom. With this new plant there should be no difficulty in meeting the demand for ice for cold storage, &c. The railway authorities have established depots in Osaka, Kobe and numerous other towns, and the industry was in its infancy, many of the trawlers were purchased in the United Kingdom, but they are now being built in the yards in Kobe, Osaka and Nagasaki. A certain amount of the twine used for the manufacture of nets is still imported from the United Kingdom and some were from Germany. It is anticipated, however, that the foreign article will eventually be eliminated, as there are two factories in Japan engaged in the manufacture of twine. The nets are all made in Japan, but trawl warp is still imported from the United Kingdom, though this also is now being produced by factories at Tokio and Kokura.

**Fire at Glasgow Harbour.** A destructive fire broke out at Glasgow Harbour on Saturday, causing damage to goods and shipping to the extent of about £50,000. The part of the harbour affected was the south quay of Queen's Dock, but it was only by the strenuous efforts of a large staff of firemen with motor pumps that the fire was prevented from spreading to the sheds on the river front in the vicinity of Finnieston. The outbreak, the cause of which is unknown originated in a shed which was full of valuable merchandise, some of which was of a highly inflammable nature. The shed and its contents were destroyed, and the flames, fanned by a strong breeze, swept for some distance over the dock and set fire to the Holt liner *Rembrandt*, which was moored to the quay. Before the vessel could be removed the fire caught a firm hold of the wooden erections on the main deck and spread to the 'tween decks. The outbreak on the vessel was ultimately extinguished by the aid of the crews of other vessels berthed in the vicinity. It is interesting to note that ever since the great fire at Kingston Dock about 18 months ago the question of providing fire floats at the harbour for extinguishing fires on shipping and on the quays, has been prominently before the Clyde Trustees, but so far no decision has been come to in the matter owing to the fact that the Trustees and the Corporation of Glasgow are unable to agree as to which body should bear the cost of equipping the harbour with fire extinguishing appliances.

**The Government and the Control of Shipping.**—The following official statement was issued on Tuesday evening: — "The Board of Trade have had their attention called to statements that the Government contemplate the requisitioning of the entire British mercantile marine. These statements are without foundation. The Government have, however, decided to take powers to deal, by means of the requisitioning of a sufficient number of vessels, with cases where an emergency of national importance exists at any time in any particular market owing to an absence of tonnage, and, further, to regulate the employment of British shipping in the carriage of cargo between foreign ports by means of licences. Fuller particulars will be issued very shortly."

## "SHIPBUILDING AND SHIPPING RECORD" TABLE OF MARINE CASUALTIES

(Including losses incidental to the war).

| Vessel. | Gross Tonnage. | Owners, Builders and Year Built | Casualty. |
|---|---|---|---|
| **Argyll**, H.M.S. | 10,850 (disp.) | Scott's S.B. & E. Co. (1904). | Oct. 28: Grounded off East Coast of Scotland in gale. Feared total loss. |
| **Birchwood**, — | — | [illegible] S.S. Co. (W. A. & W. W. Consterdine, Managers), Middlesbrough. Ropner & Sons, Stockton. (1910.) | Sept. 29: Stranded at Gullpoat during hurricane. Oct. 20: Damage slight. |
| **British Prince**, ss. .. | 5,936 | Prince Line (J. Knott), Newcastle. Short Bros., Sunderland. (1914.) | Nov. 20: Ashore, Possession Island (Luderitz Bay). |
| **Carmen** [illegible] | | | Oct. 26: Torpedoed by British submarine in Sea of Marmora and sunk. |
| **Colorado**, ss. . . | 2,765 | Mallory SS. Co., New York. J. Roach & Son, Chester, Pa., U.S.A. (1879.) | Oct. 25: On fire—abandoned off Cape Romain. Oct. 27: Towed into harbour. Fire under control. |
| **Corona**, — | 1,850 | Akties. H.M. Wrangell & Co., Haugesund. H. F. Ulrichs, Vegesack. (1882.) | Oct. 19: Bound England to Bergen. Sprung a leak in bad weather and had to be abandoned. Crew landed. |
| **Dalalfven**, — | 1,046 | Rederi A.B. Re[illegible] Gothenburg. Flensburger Schiffsb. Ges., Flensburg (1910.) | Oct. 20: Torpedoed by British submarine off Hatringe. |
| **Eidsiva**, — | 1,092 | A. Halvorsen, Bergen. Bergens Mek. Vaerks., Bergen. (1902.) | Oct. 31: Reported "sunk." |
| **Elysian**, ss. | 514 | Great Central Co., Op. Eng. & Ship. Repg. Co., Grimsby. Cochrane & Sons, Selby. (1912.) | Nov. 1: Ashore, Goodwin Sands. Crew landed. |
| **Erik Giessen**, — . | 187 | Aktie. Erik Gjessen (O. G. Gjessen), Skudeshavn, Norway. S. Olsen, Arendal. Tivedestrand. (1909.) | Oct. 30: Ashore near Newburgh, Aberdeenshire. |
| **Fido**, — | 692 | T. Wilson, Sons & Co., Hull. Earles Co., Hull. (1906.) | Oct. 24: Collision with ss. *Balbam* in Hull Roads. Put back for repairs. |
| **Gardepee**, — | 1,633 | Gardépée S.S. Co. (Morel, Ltd.), Cardiff. W. Pickersgill & Sons, Sunderland. (1882.) | Oct. 27: Bound Middlesbrough for Nantes. Ashore north part of Holme Sands near Lowestoft. Oct. 29: Refloatd. |
| **Great Northern**, — | 8,255 | Spokane, Portland & Seattle Railway Co., Astoria, Oregon. W. Cramp & Sons S. & E.B. Co., Philadelphia. (1915.) | Oct. 28: Struck submerged object. Damaged propeller, steering gear and rudder. |
| **Highland Warrior**, —. | 7,485 | Nelson S.N. Co. (H. & W. Nelson), London. Russell & Co., Port Glasgow. (1911.) | Ashore near Corunna (see *Shipbuilding and Shipping Record*, Oct. 21). Oct. 28: Report from Ferrol states that after gale on Oct. 26 bridge structures, saloons stove in. After deck-house washed away near No. 2 hatch. Nov. 1. Completely broken up and entirely submerged. |
| **Hythe**, H.M.S. (auxiliary sweeper). | | | Oct. 30: Sank after collision with another warship off the Gallipoli Peninsula; 160 believed lost. |
| **Llama**, ss. .. | 180 | Standard Oil Co. (New Jersey), New York. Armstrong, Mitchell & Co., Newcastle. (1890.) | Nov. 1: Bound New York to Copenhagen. Stranded on Skae Skerries, Westray Firth. |
| **Marquette** (British trans[illegible]) | 7,057 | British Government. A. Stephen & Sons, Glasgow. (1898.) | Oct. 26: Torpedoed in Aegean Sea. 99 personnel unaccounted for. |
| *No.* 96 (t.b.d.) | | | Nov. 1: Sank, Straits Gibraltar, after collision with mercantile fleet auxiliary. |
| **Pachitea**, ss. | 1,767 | Cia. Peruana de Vapores y Dique del Callao, Callao, Peru. Chant. de Normandie, Rouen. (1911.) | Oct. 28: Struck Rock Lemas, beached and abandoned. |
| **Rosyth**, — . | 576 | Kirkcaldy S.S. Co. (W. H. H. Hutchison & W. Williamson), Kirkcaldy. Dundee S.B. Co., Dundee. (1903.) | Nov. 1: Stranded at Whitburn Steel, near Sunderland. |
| **Selma**, — | 1,654 | Akt. Excelsior (S. O. Stray & Co.), Christiansand, Norway. Nyland Vaerksted, Christiania. (1906.) | Oct. 27: Sank. Nov. 2: Crew believed saved. |
| **Vitruvia**, — | 4,753 | Vitruvia S.S. Co. (Gow, Harrison & Co.), Glasgow. Russell & Co., Port Glasgow. (1911.) | Oct. 28: Collided with another steamer. Extensive damage to port quarter and propeller. |

## "SHIPBUILDING AND SHIPPING RECORD" TABLE OF SHIP SALES.

| Name and type. | Tonnage. | Dimensions. Draught in ( ). | Sold by, to | Builders, hull and year. | Machinery and builders. | Remarks. |
|---|---|---|---|---|---|---|
| **Anglo Brazilian,** ss. (shelter dk.), re-named **Chepstow Castle** | 7,486 gr. 4,668 net. 10,512 d.w. | 425½′ × 56¼′ × 28¼′ (30′) | Nitrate Producers SS. Co. (Lawther, Latta & Co.), London, to the Union-Castle Mail SS. Co., Ltd. | Short Bros., Sunderland (1913) | 25½, 36½, 52½, 76 × 54 (N.E. Mar. Eng. Co., Newcastle) | Price about £236,000. |
| **Bintang,** ss. (awning dk.) | 2,859 gr. 1,813 net. | 310′ × 44¼′ × 17⅞′ (20¼′) | Akties. det Ostasiatiske Kompagni, Copenhagen, to Norwegian buyers | Akt. Burmeister & Wain, Copenhagen (1907) | 21½, 34⅓, 60 × 39 (Akt. Burmeister & Wain) | -- |
| **Bollington Grange,** ss. (ex *Bateshire*) re-named **Canoness** | 5,583 gr. 3,619 net. 8,400 d.w. | 420′ × 54′ × 28½′ | Bollington Grange SS. Co. (Houlder Bros. Co.), Glasgow, to Furness-Houlder Argentine Lines, London | Hawthorn, Leslie & Co., Newcastle (1893) | 29, 46¼, 75½ × 54 (Hawthorn, Leslie & Co.) | |
| **Buzen Maru,** ss. (pt. awning dk.) (ex *Etona*) | 2,495 gr. 1,600 net. 3,700 d.w. | 297′ × 40′ × 19′ (21½′) | Moji Kisen Kabushiki Kaisha, Kobe, Japan, to buyers not stated | Richardson, Duck & Co., Stockton (1890) | 22½, 77, 61 × 42 (Blair & Co., Stockton) | Price about £28,000. Changed hands in June last year for about £11,500. |
| **Daiten Maru,** ss. (ex *Lituania*, ex *Kuma*, ex *Lancashire*) | 4,555 gr. 2,824 net. 5,650 d.w. | 400½′ × 45½′ × 28′ (25¼′) | S. Fukagawa, Dairen, Manchuria, to buyers not stated | Harland & Wolff, Belfast (1889) | 28, 47, 78 × 60 (Harland & Wolff) | Price about £39,000. |
| **Darleydale,** ss... | 3,095 gr. 1,992 net. 5,100 d.w. | 325¼′ × 48⅛′ × 21½′ (20½)′ | Dale SS. Co. (Lucas & Co.), Bristol, to Cardiff buyers | W. Gray & Co. West Hartlepool (1899) | 24, 38⅛, 64 × 42 (Cen. Mar. Eng. Works, W. Hartlepool) | Price about £47,500. |
| **Dunster,** ss. (spar dk.) re-named **Suevier** | 4,515 gr. 2,869 net. | 360′ × 48′ × 20½′ | Tatem S.N. Co. (W. J. Tatem, Ltd.), Cardiff, to Brys & Gylsen, London | Richardson, Duck & Co., Stockton, (1902) | 26, 42½, 69½ × 45 (Blair & Co., Stockton) | Price about £60,000. |
| **Evangel s,** ss. (pt. awning dk.) (ex *Highland Prince*) | 2,510 gr. 1,578 net. 3,890 d.w. | 290′ × 40′ × 19¾′ (21¼′) | T. Pangalos, Syra, to Scandinavian buyers | Short Bros., Sunderland (1899) | 16, 20, 35½, 55 × 39 (G. Clark, Sunderland) | Price about £30,000. Changed hands in May, 1912, for about £10,250. |
| **Florentino,** ss. (ex *Gunwell*, ex *Cycle*) | 3,410 gr. 2,227 net. 5,860 d.w. | 331½′ × 48′ × 24½′ (22½′) | Polzeath SS. Co. (McKenzie & Thomas), Liverpool, to A. Vickery, Cardiff | J. L. Thompson & Sons, Sunderland (1900) | 24½, 40½, 65 × 42 (J. Dickinson & Sons, Sunderland) | |
| **General Lyautey,** ss. (ex *Mont-Agoual*, ex *Vostitza*, ex *Gulf of Ancud*) | 2,532 gr. 1,734 net. 4,110 d.w. | 314⅛′ × 42½′ × 23¾′ (23½′) | Ligne Cettoise de Nav. (F. Puech fils), Cette, France, to the Cie. Generale Trans-Atlantique, Paris | Hawthorn, Leslie & Co., Newcastle (1890) | 26, 42, 69 × 48 (Blair & Co., Stockton) | Price about £28,000. |
| **Hebe,** s.b. (ex *Olga*) | 1,146 gr. 1,071 net. 1,720 d.w. | 208½′ × 34½′ × 19¼′ (18½′) | Akties. Hebe (H. Hansen), Lillesand, to Bugge & Olsen, Larvik | Schiffs von H. Koch, Lübeck (1892) | | Price about £7,750; changed hands in 1906 for about £3,500) |
| **Islami,** ss. (ex *Gulf of Trinidad*) | 2,545 gr. 1,605 net. 3,450 d.w. | 300′ × 40¼′ × 23¼′ | Bombay & Persia S.N. Co., Bombay, to British buyers | R. Dixon & Co., Middlesbrough (1887) | 26, 42, 69 × 48 (Blair & Co., Stockton) | |
| **Kent,** ss. (shelter dk.) re-named **Brodtea** | 5,527 gr. 3,548 net. 8,800 d.w. | 420′ × 54′ × 28½′ (27′) | Federal S.N. Co., London, to Blue Star Line, London | Hawthorn, Leslie & Co., Newcastle (1899) | 30, 48, 78 × 54 (Hawthorn, Leslie & Co.) | -- |
| **Marion,** s.b. ... | 1,587 gr. 1,483 net. 2,450 d.w. | 250′ × 38′ × 22½ (20½′) | Akties. "Lika" (C. A. Olsen), Borøen, Norway, to buyers not stated | A. McMillan & Son, Dumbarton (1886) | | Price about £6,000; changed hands in February, 1912, for about £3,700 |
| **Nador,** ss. (pt. awning dk.) | 2,031 gr. 1,302 net. 3,110 d.w. | 265½′ × 37′ × 19′ (21½) | New Line SS. Co. (R. Mackie & Co.), Leith, to J. Ingmansson, Stensnäs, Mörrum, Sweden | W. Gray & Co., W. Hartlepool (1893) | 20, 31½, 53 × 36 (Cen. Mar. Eng. Works, W. Hartlepool) | |
| **Ribston,** ss. (spar dk.) | 3,372 gr. 2,185 net. 5,300 d.w. | 330′ × 43′ × 18½′ (23¼′) | London Gate SS. Co. (H. W. Dillon & Sons), London, to buyers not stated | W. Gray & Co., W. Hartlepool (1894) | 24, 38, 64 × 42 (Cen. Mar. Eng. Works, W. Hartlepool) | Price about £40,000. Changed hands in April last for £25,000. |
| **Slingsby,** ss. (pt. awning dk.) | 3,231 gr. 2,091 net. 4,905 d.w. | 322 × 41⅛ × 20½′ (23⅛′) | R. Ropner & Co., W. Hartlepool, to British buyers | Ropner & Sons, Stockton (1892) | 23½, 39, 64 × 42 (Blair & Co., Stockton) | Price about £35,000 |
| **Samui,** ss. (awning dk.) | 2,859 gr. 1,813 net. | 310′ × 44¼′ × 17½′ (20¼′) | Akties. det Ostasiatiske Kompagni, Copenhagen, to Norwegian buyers | Akt. Burmeister & Wain, Copenhagen (1907) | 21, 34½, 60 × 39 (Akt. Burmeister & Wain) | -- |
| **Sophie H.,** ss. .. | 2,930 gr. 1,851 net. | 325½′ × 47½′ × 21¼′ | Stoomv. Maats "Sophie H" (N. Haas), Rotterdam, to A. Bergmann, Bergen | Kon. Maats. de Schelde, Flushing (1910) | 23½, 38, 64 × 42 (Kon. Maats. de Schelde) | Price about 1,200,000 gilders. |
| **Sparti,** ss. (pt. awning dk.) (ex *Grangewood*) | 2,540 gr. 1,631 net. 3,920 d.w. | 295′ × 41′ × 18½′ (20¼′) | P. Foustanos, Syra, to Norwegian buyers | R. Thompson & Sons, Sunderland (1892) | 23, 37½, 61½ × 39 (G. Clark, Sunderland) | Price about £35,000. |
| **Staffa,** ss. (well dk.) | 1,008 gr. 560 net. | 220½′ × 30½′ × 14¼′ | Leith, Hull & Hamburg S. P. Co. (J. Currie & Co.), Leith, to buyers not stated | Ramage & Ferguson, Leith (1902) | 18½, 30, 49 × 33 (Ramage & Ferguson) | Price about £26,000. |
| **Vauxhall,** ss. ... | 3,629 gr. 2,331 net. 6,056 d.w. | 340′ × 48′ × 25′ (22¾′) | W. Hartlepool S.N. Co., W. Hartlepool, to British buyers | Devines S.B. & D.D. Co., W. Hartlepool (1900) | 25, 40, 66 × 45 (Sir C. Furness, Westgarth & Co., Middlesbrough) | Price about £50,000. |
| **Vulcanus,** ss. (pt. awning dk.) (ex *Mar*, ex *Ironopolis*) | 2,409 gr. 1,417 net. 3,311 d.w. | 295′ × 38½′ × 20′ (22½′) | Oxelosunds Rederiakt. (P.Tham), Stockholm, to buyers not stated | R. Dixon & Co., Middlesbrough (1889) | 22½, 36½, 60⅞ × 39 (Blair & Co., Stockton) | Price about £29,500. |
| **Wooda,** ss. (shelter dk.) | 3,804 gr. 2,460 net. | 340′ × 48′ × 25½′ | Tatem S.N. Co. (W. J. Tatem, Ltd.), Cardiff, to Brys & Gylsen, London | Richardson, Duck & Co., Stockton (1901) | 26, 42½, 69½ × 45 (Blair & Co., Stockton) | Price about £60,000. Sold in 1909 at a valuation of £20,984. |

We are informed by Mr. Peder Wiborg that contrary to reports his vessel the **Atacama** has not been sold.

## SHIPPING SHARE MARKET.

point of occupied territory is made by the Allies. No attention is circulated from New York, apparently from German sources. It is quite no terms offered by Germany have the least possibility of being accepted. Business is brisk and prices improving because there is the prospect of a decisive programme being entered upon by the Entente Powers. In the ... the only official document reaching the ... the City of Dublin Steam Packet Company. The ... ended August 31 show that the balance at the ... was £20,003, compared with £11,163 for the first ... and £8,840 for the two periods of 1914. There is not much difference in the results attained, although there is, we imagine, some ... the current year in view of the Admiralty's ... to reconsider the terms of payment of hire of steamships against which the City of Dublin Steam Packet Company protested early in the year. The ... the Royal Mail have again been in demand and have now ... Cunards have also found buyers. Indo-China ... were very active last week on all kinds of reports, have fallen into neglect. The shipbuilding section has also been quiet as the market is still awaiting clearer evidence of the financial effect of the war profits tax.

## SHIPPING, SHIPBUILDING, ENGINEERING AND MARINE INSURANCE SHARE LIST.

### SHIPPING AND DOCKS

| Name. | Share and paid. | Extreme quotations, 1913. | Last ann. div. % or per share. | Yield. % | Quotation, July 30, 1914. | Cash price during week. |
|---|---|---|---|---|---|---|
| | £ | | | | | |
| African S.S. | £ | 21⅛–19 | 7 | 7⅓ | 18–20 | 18–20 |
| Ardan Line ... Deb. | 100 | 95–89 | 4 | 4⅓ | 94½–96½ | 94 |
| Ardrossan Line ... Cum. pref. | £ | 99½–96 | 5½ | 5⅔ | 96–100 | 98½ |
| Do. ... ... Deb. | Stk. | 98½–96 | 4½ | 4⅔ | 100–100 | 100–— |
| Argentine Nav. ... Cum. pref. | £ | 29/6–25/3 | 3 | 4 | 3/16–1/8 | — |
| Do. ... ... Deb. | Bds. | 104⅜–100½ | 6 | 6 | 98–100 | 99 |
| Australasian Un. S. Nav. Deb. | Stk. | 81½–80½ | 4 | 4⅞ | 80–83 | 80–— |
| Bailey Steam ... ... A | £ | 7/8–4/3 | 5 | — | 4½ ... | — |
| British & Austrian Nav. Deb. | Stks. | 102–101 | 4½ | 4½ | 99½–99½ | 99 |
| British India Nav. ... Deb. | Stk. | 104–98⅜ | 4½ | 4½ | 99½–100 | 99 |
| Bucknall SS. ... Cum. pref. | £ | 2⅜–1¾ | 5⅛ | — | — | — |
| Cairn Line ... Deb. | Bds. | 102–94 | — | 5½ | 94–96 | 96½–94 |
| Clan Line ... ... Ord. | | 142–9 | 15 | 10½ | 10½–11 | — |
| Court Line ... ... Ord. | £1 | | 1½ | 7 | | 1⅛ |
| Cunard SS. ... ... Ord. | 1 | 3⅝–2⅝ | — | — | 1⅛–1 | — |
| Do. ... Cum. pref. | Stk. | 103–97½ | 7 | 7 | 99–101 | 99½ |
| Do. ... ... Deb. | Stk. | 102⅜–99 | 4½ | 4½ | 101–103 | 99 |
| Elder Line ... ... Deb. | Stk. | 103–100 | 4½ | 4½ | 98–102 | 99 |
| Elder Dempster ... Cum. pref. | 1 | 1⅛–¾ | 5⅛ | 5⅛ | 1⅛–1⅛ | 1⅛ |
| Do. ... ... Deb. | Stk. | 1⅛–99½ | 5 | 5⅛ | 1⅛–102 | 99 |
| Ellerman Lines ... Pref. Ord. | 10 | 10⅜–10⅛ | 9½ | 9 | 10–10⅜ | 10 |
| Do. ... Cum. pref. | 10 | 10⅜–1 | 4½ | 4½ | 10–10⅜ | 9⅞ |
| France-Fenwicks ... Cum. pref. | 5 | 97/6–92/6 | 5 | 5⅓ | 4½–5 | 4½ |
| Furness, Withy ... Ord. | 1 | 34–25/6 | 10 | 8½ | 1½–1½ | 1½ |
| Do. ... Cum. pref. | 10 | 9⅝–9⅛ | 5 | 5⅓ | 9⅜–10 | 9⅜ |
| General Steam Nav. ... Ord. | 7½ | 6⅛–5⅜ | 6 | 5⅔ | 5⅝–6 | 5⅝ |
| D. ... ... Pref. | 8 | 7⅛–7⅛ | 6 | 5⅔ | 7⅛–7⅛ | 7⅛ |
| Houlder Line ... Cum. pref. | 5 | 5/–4/6 | Nil. | Nil. | 2½–2½ | 2½ |
| Do. ... ... Deb. | Stk. | 84⅜–80 | 4½ | 5⅓ | 81–86 | 81½ |
| Houlder Bros. ... Cum. pref. | 5 | 4⅛–3⅞ | 3⅜ | 3⅜ | 4⅜–4⅝ | 4⅜ |
| Do. ... ... Deb. | Stk. | 85–78 | 4½ | 5⅓ | 81–86 | 82 |
| India Gen. Nav. & Rly. ... Ord. | 10 | 9⅜–7⅛ | 5 | 7 | 9–10 | 9½ |
| Indo-China N. ... Pref Ord. | 5 | 5⅛–3⅞ | 6 | — | 3¾–4¼ | 3⅞ |
| Irrawaddy Flotilla ... ... | 40 | 125–114 | 15 | 12⅓ | 126½–125 | — |
| King Line ... ... Ord. | 10 | 9¼–8 | 8 | 8⅔ | 8¾–9¼ | 9 |
| La Guaira Harbour ... Deb. | Stk. | 87–79 | 5 | 5⅓ | 78–80 | 78 |
| Lamport & Holt ... Cum. pref. | £1 | 1⅛–⅝ | 6 | 6 | ⅞–1⅛ | — |
| Leyland (F.) ... Cum. pref. | 10 | 11–9⅜ | 10 | 10⅔ | 7⅞–8 | 7⅞ |
| D. ... ... Deb. | 100 | 99⅜–93½ | 4 | 4 | 99–101 | — |
| Mercantile SS. ... ... Ord. | 5 | 8⅛–6¼ | 17½ | 14½ | 6–6½ | — |
| D. ... ... Pref. | 1 | 18–16⅛ | 5 | 5⅓ | ¾–1 | — |
| Moor Line ... ... Ord. | 1 | 14–11⅛ | 15 | — | — | — |
| Nelson Steam Nav. ... Deb. | 100 | 103⅜–99 | 5 | 5 | 99½–101 | 97½ |
| New Zealand ... ... Ord. | £ | 20–13 | 8 | 4 | 14½–15½ | 14½ |
| Do. ... ... Deb. | Stks. | 95–92½ | 4 | 4⅓ | 92–94 | 92½ |
| Nitrate Producers SS. ... Ord. | 5 | 8⅝–5 | 17½ | 9⅓ | 8–8½ | 12½ xd |
| Do. ... Cum. pref. | 5 | 5–97/6 | 5 | 5 | 4½–5 | 4⅝ |
| Oceanic Steam. Nav. ... Deb. | 1 | 100–96½ | 4½ | 4⅔ | 97–99 | 99⅛ |
| Orient.Stm.Nav.Co. Cum. pref. | 1 | 10⅛–9⅝ | 7 | 7⅓ | 9⅜–10 | 9⅜ |
| Do. ... ... Deb. | 100 | 99–94⅜ | 4½ | 4⅓ | 98–100 | 96 |
| P. & O. S. N. ... Cum pref. | 100 | 125⅜–107 | 5 | 5⅓ | 109–112 | 96 |
| Do. ... ... Def. | 100 | 350–270 | 15 | 5⅔ | 270–290 | 291 |
| Do. ... ... Deb. | Stk. | 91–83 | 3½ | 3⅔ | 84–86 | 76 |
| Prince Line ... ... ... | 1 | 2⅝–2⅜ | 5 | 5⅓ | 1–1½ | 2 |
| R.M.S.P. ... ... Ord. | 100 | 143–100½ | Nil. | Nil. | 82–87 | 87 |
| Do. ... ... Pref. | Stk. | 1⅝–99 | 5 | 5⅓ | 98–101 | 86½ |
| Do. ... ... Deb. | Stk. | 104½–100⅜ | 4½ | 4⅓ | 101–103 | — |
| Shaw, Savill & Alb. Cum. pref. | 5 | 5⅜–98⅝ | 5 | 5⅓ | 4½–5 | 4⅝ |
| Shell Transport ... ... Ord. | 1 | 5½–3⅜ | 1½ | 3⅓ | 4–4⅛ | 4⅛ |
| Do. ... Cum pref. | 10 | 11⅞–10 | 5 | 5⅓ | 10½–10⅝ | 10⅝ |
| Sutherland SS. Co. ... ... | £1 | 1⅛–1 | 2 | 13⅓ | 1–1⅛ | 1⅛ |
| Union-Castle SS. Cum. pref. | 10 | 10–9½ | 4½ | 5 | 9¾–9⅝ | 9 |
| Do. ... ... Deb. | Stk. | 95⅜–92 | 4 | 4 | 96–96 | 96 |
| West Hartlepool ... ... Pref. | 10 | 4⅞–3⅜ | 7½ | 7⅓ | 2⅝–3⅜ | 2⅝ |

### INSURANCE

| | | | | | | |
|---|---|---|---|---|---|---|
| Alliance ... ... ... | 20 (2½ pd.) | 12⅛–11 | 12/– | 7 | 11⅛–12⅛ | 12 |
| Do. Reversions ... | 1 | 1⅛–1 | 12/– | 12 | 1⅛–1⅛ | 1⅛ |
| Indem. Mutual Marine ... ... | 15 (3 pd.) | 10½–8 | 1½ | 10 | 10–12 | — |
| London Assurance ... ... | 25 (2½ pd.) | 54–48 | 20 | 6 | 54–56 | 42 |
| Marine Insurance ... | 25 (15 pd.) | 38⅜–36½ | 45/– | 6 | 38¾–39¾ | 35½ |
| Maritime Insurance ... ... | 10 (2 pd.) | 5–4½ | 12½ | — | 5–5⅛ | — |
| Merchants' Marine Insurance ... | 10 (2½ pd.) | 66 3–61/3 | 7½ | 5 | 4–4½ | — |
| N. British & Mercantile Ord. | 25 (5 pd.) | 40½–38½ | 4/– | 7 | 4⅝–4⅞ | 4⅞ |
| Do. Pref. | Stk. | 1⅛–98 | 4 | 5⅓ | 98–100 | 100 |
| Phœnix Assurance ... ... | 10 (5 pd.) | 7⅛–7 | 40 | — | 7⅛–7⅜ | 7⅛ |
| Reliance Marine ... ... | 10 (2 pd.) | 7–6½ | 17½ | 4 | 7⅜–7⅝ | 7⅜ |
| Royal Exchange Assurance ... | Stk. | 210–196½ | 10 | 5 | 213–218 | 214 |
| Sea Insurance ... ... | 10 (2 pd.) | 20–17½ | 8 | 4 | 20–21 | — |
| World Marine, Limited ... | 5 (2 pd.) | 25/–23 1⅜ | 5 | 5⅓ | 1⅛–1⅛ | 1⅛ |

* With arrears. † Includes 2½ bonus.

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|---|---|---|---|---|---|---|
| | £ | | | | | |
| Babcock & Wilcox ... Ord. | 1 | 69 4⅜–56/3 | 16 | 5⅔ | 2⅜–2⅜ | 2⅛ |
| Baldwins ... Cum. pref. | 1 | 22/6–21/3 | 5½ | 5⅓ | 1⅛–1⅛ | 1⅛ |
| Do. ... ... Deb. | Stk. | 100¾–100¼ | 4½ | 4⅓ | 97–99 | 98 |
| Bayliss, Jones ... Cum. pref. | 1 | — | 5 | 7⅛ | ⅜–⅝ | ⅜–⅛ |
| Bell Bros. ... ... Cum. pref. | 10 | 12⅛–11 | 6 | 5⅓ | 11⅜–12⅛ | 10½ |
| Do. ... ... ... Deb. | Stk. | 98–96⅜ | 4 | 4⅛ | 96–98 | 96–98 |
| Bessemer (Henry) ... Ord. | 1 | 1⅝–1⅛ | 10 | 8⅔ | 1⅛–1⅛ | 1⅛–1⅛ |
| Bolckow Vaughan ... Ord. | 1 | 22/6–19/4½ | 6 | 6⅓ | 1⅛–1⅛ | 1⅛ |
| Do. ... ... Cum. pref. | 20 | 21½–20/– | 5 | 5⅓ | 20–21 | 19½ |
| Cargo Fleet Iron ... ... Ord. | 1 | 11.10½–7/6 | 2½ | 5 | ⅛–⅛ | ⅛ |
| Do. ... ... ... Deb. | 100 | 91–85½ | 4½ | 5⅓ | 89–92 | 87 |
| Consett Iron Co. ... ... Ord. | 1 | 88/6–74/6 | 30 | 10½ | 3¼–3⅜ | 2⅛ |
| Dominion Iron & Steel ... ... | Bds. | 100⅛–88½ | 5 | 6 | 83–87 | 75½ |
| Dorman, Long ... ... Ord. | 1 | 21/6–16/9 | 7½ | 8⅔ | ⅝–⅝ | 1⅛ |
| Do. ... ... Deb. | Stk. | 88½–85½ | 4 | 4⅔ | 87–90 | 84 |
| Ebbw Vale Steel & Iron Ord. | 1 | 18/—16/– | 10 | 11⅓ | 2½–2⅞ | 2½ |
| Guest, Keen & Nettefds Ord. | 1 | 68.9–61/3 | 15 | 4⅓ | 3⅜–3⅝ | 3⅜ |
| Do. ... ... Cum. pref. | 5 | 5⅜–5⅛ | 5 | 4⅔ | 5⅛–5⅛ | 5⅛ |
| Do. ... ... ... Deb. | Stk. | 100⅜–95⅜ | 4 | 4⅓ | 96–98 | 85⅜ |
| Hadfield's Steel Foundry Ord. | 1 | 63/—58/9 | 22½ | 6⅔ | 3–3⅛ | 3⅛ |
| Hawthorn (R. & W.) Leslie Ord. | 10 | 13—12 | 10 | 7⅓ | 13⅜–13⅝ | 13⅜ 13⅝ |
| Hobetson Bros. ... ... ... 5 (4 pd.) | | 7–5⅜ | 10 | 7⅓ | 6–6⅛ | 6–6⅛ |
| Jessop (W.) & Sons ... Ord. 5 (4 pd.) | | 6⅝–6⅜ | 15 | 11⅓ | 6⅜–6⅝ | 6⅜ |
| Lanarkshire Steel ... Cum. pref. | 10 | 7⅛–6⅝ | 5 | 6⅔ | 5½–6⅜ | 6 |
| Lysaght (J.) ... Cum. pref. | 1 | 27/6—25/– | 6 | 5 | 1⅛–1⅜ | 1⅛ |
| Do. ... ... ... Deb. | Stk. | 108⅜–102½ | 4½ | — | 104–106 | — |
| Manganese Bronze ... Ord. | 1 | ⅜–⅜ | 6 | 11 | ⅜–⅜ | ⅜ |
| Do. ... ... Cum. pref. | 1 | 1–⅞ | 8 | 8⅓ | ¾–1 | ¾ |
| North-Eastern Steel ... Deb. | Stk. | 89—92 | 4½ | — | — | — |
| Palmers Ship & Iron "A" | 1 | ⅞–⅜ | Nil. | Nil. | ⅝–⅜ | ⅝ |
| Scott (Walter) ... ... Ord. | 1 | 16'—14/6 | 5 | 6⅓ | ⅜–⅜ | ⅜ |
| Do. ... ... Deb. | Stk. | 86—82 | 4 | 4⅔ | 81–82 | 89–91 |
| Sheffield Forge ... ... Ord. | 1 | 1⅞–1⅛ | 12½ | 7 | 1⅛–1⅛ | 1⅛ |
| Shelton Iron & Steel ... Deb. | 100 | 99½–90 | 5 | 5⅓ | 93—98xd | 94½ |
| S. Durham Steel & Iron Ord. | 1 | 35/—23/6 | 10 | 6⅓ | 1⅛–1⅛ | 1⅛ |
| Do ... ... Cum. pref. | 1 | 20/6—19/– | 8 | 5⅓ | ⅞–1⅛ | 1⅛ |
| Do. ... ... ... Deb. | Stk. | 95—98 | 4½ | 4⅔ | 90–92 | 90–92 |
| Steel Co. of Scotland ... Ord. | 10 | 12⅜–8½ | 5 | 5⅔ | 8½–9 | 8¾–9⅛ |
| Stewarts & Lloyds Pref. ord. | 10 | 21⅞–20 | 10 | 5⅓ | 20–21 | 19⅝ |
| Do. ... ... Cum. pref. | 10 | 14⅞–13¼ | 6 | 4⅔ | 11⅜–13⅞ | 13½ |
| Stone (J.) ... ... Cum. pref. | 10 | 9⅛–9 | 5 | 5⅔ | 8¾–9⅛xd | 9⅛ |
| United States Steel ... Ord. | 100$ | 71⅝–50 | 3 | 3⅔ | 61—61⅛ | 59⅝ |
| Do. ... ... Cum. pref. | 100$ | 113⅞—104½ | 7 | 5⅓ | 112—113 | 123⅝ |
| Vickers Ltd. ... ... Ord. | 1 | 43/6—33/3 | 2½ | 7⅛ | 11⅛–11⅛ | 11⅛ |
| Do. ... ... ... Pref. | Stk. | 106½—99 | 5 | 5 | 104—107 | 100 |
| Do. ... ... ... Deb. | Stk. | 100⅜–91½ | 4 | 4⅓ | 96½–98½ | 82½ |
| Weardale Steel ... Def. ord. | 1 | 21/—17/– | 6 | 7⅛ | ⅜–1⅛ | — |
| Do. ... ... Cum. pref. | 1 | 20.1⅝–18/– | 6 | 6⅔ | 1⅝–1⅝ | — |
| Do. ... ... ... Deb. | Stk. | 77—73½ | 4 | 5 | 77—80 | 77—78 |
| Workington Iron & Steel Ord. | 1 | 16/6—12/3 | 6 | 8⅓ | ⅝–⅝ | ⅝ |

### SHIPBUILDING AND MARINE ENGINEERING.

| | | | | | | |
|---|---|---|---|---|---|---|
| Armstrong, Whitworth ... Ord. | 1 | 60—39/ | 12½ | 6 | 13⅜–2⅛ | 1⅛ |
| Do. ... ... Cum. pref. | 5 | 9⅝—8⅛ | 4 | 5⅓ | 4⅛–4⅛ | 4⅛ |
| Do. ... ... Deb. | Stk. | 98⅛–94½ | 5 | 6⅓ | 96–98 | 98 |
| Beardmore (W.) ... ... Ord. | 100 | 96⅜–91½ | 4½ | 5⅓ | 94–96 | 89 |
| Brown (John) ... ... Ord. | 1 (15s. pd.) | 23—17/9 | 12½ | 9⅓ | 20⅝–21⅛xd | 20⅝ |
| Do. ... ... Cum. pref. | 10 | 10½–9⅛ | 5 | 5⅛ | 9⅜–10xd | 8⅝ |
| Cammell Laird ... ... Ord. | 5 | 3⅝–2⅜ | 7½ | 7⅓ | 3⅝–4⅛ | 4⅛ |
| Do. ... ... Cum. pref. | 5 | 92/6—79/– | 5 | 6⅓ | 4¼–4⅜ | 3⅞ |
| Do. ... ... ... Deb. | 100 | 90½–84½ | 4½ | 5 | 92–94 | 90 |
| Dunlop (Jas.) ... ... Ord. | 1 | 18.6—17/6 | Nil. | — | ⅛–⅜ | 1⅛ |
| Do. ... ... Cum. pref. | 1 | 1⅛–⅝ | 6 | 7⅓ | ⅝–1 | 1⅛ |
| Fairfield Shipbldg Cum. pref. | 10 | 10—7⅞ | 6 | 8⅔ | — | 7⅛ |
| Fleming & Ferguson ... Ord. | 10 | 20½—12⅜ | 10 | 8⅓ | 14½–14½ | 14⅜ |
| Gray (Wm.) ... ... Deb. | 100 | 100½—100 | 4½ | 4½ | 100–102 | 100 |
| Henderson (D. & W.) Cum. pref. | 1 | ⅞–⅝ | 5 | 12 | ⅛–⅛ | ⅝ |
| Richardsons Westgarth Ord. | 1 | 3/6—1/9 | Nil. | Nil. | ⅛–⅛ | — |
| Do. ... ... Cum. pref. | 1 | 9,9—4/3 | Nil. | Nil. | ⅛–⅛ | — |
| Do. ... ... ... Deb. | Stk. | 70—58 | 4½ | 6⅔ | 55–58 | 69⅜ |
| Simons (W.) ... Cum. pref. | 10 | 10½—10 | 5 | 4⅔ | 10¼–10½ | 10¼ |
| Stephenson (R.) ... ... Ord. | 1 | 66⅝–53 | Nil. | Nil. | — | — |
| D. ... ... Deb. | Stk. | 66¼—63 | Nil. | Nil. | — | — |
| Swan, Hunter & W. R. ... Ord. | 1 | 19.10½–16/– | †10 | 10½ | 1⅛–1 | 1⅛ |
| Do. ... ... Cum. pref. | 1 | 19.9—17/9 | 5 | 5⅓ | 1⅛–1 | 1⅛ |
| Do. ... ... ... Deb. | Stk. | 90½—88 | 4½ | 4⅔ | 90–93 | 90–93 |
| Thornycroft (John I.) ... Ord. | 1 | 27.6—12/6 | 8 | 8 | ⅝–⅝ | 1 |
| Do. ... ... Cum. pref | 1 | 19,3—11/3 | 6 | 7⅓ | ⅝–⅝ | ⅝ |
| Do. ... ... ... Deb. | 100 | 94—91 | 5 | 5⅓ | 88–92 | 93 |
| Wallsend Slipway ... Ord. | 1 | 1⅜–1⅛ | 10 | — | 1⅛ 1⅛ | — |
| Do. ... ... Cum. pref. | 1 | 20/—20/– | 5 | — | 1⅛ 1⅛ | — |

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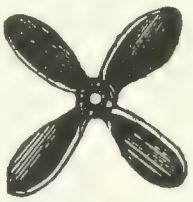

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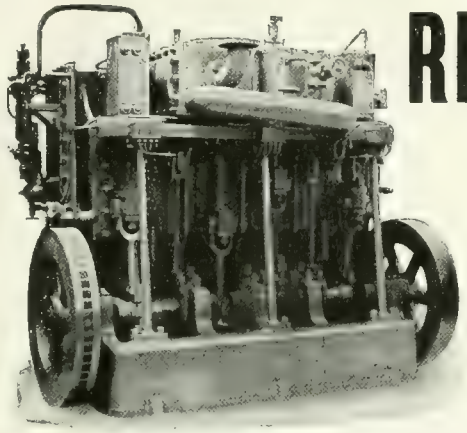

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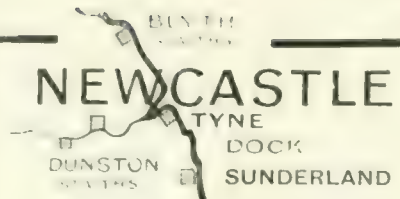


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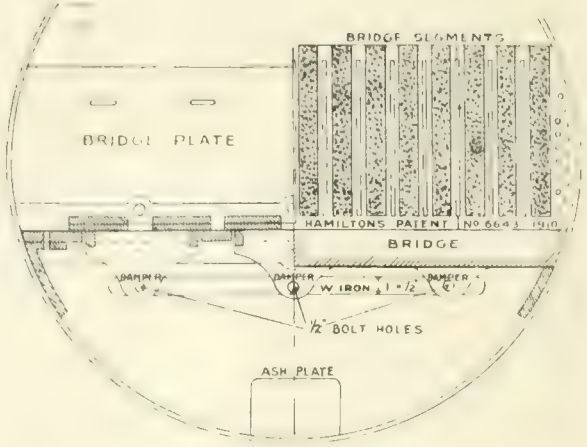


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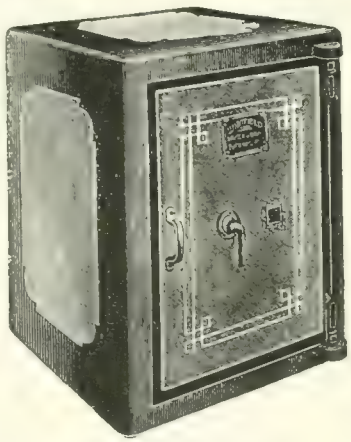

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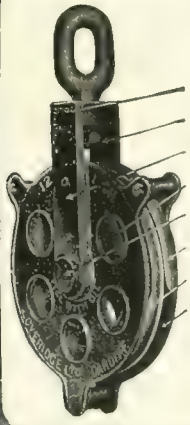

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ALL STEAM BOILERS
should have them fitted.

It automatically keeps the water circulating, giving a uniform temperature throughout the Boiler, doing away with racking strains which cause leaky seams, grooved plates, etc., through unequal expansion.

Easier Steam, Saves Coal.

MAKERS:
**THE BERESFORD ENG. CO.,**
**Beresford Lane, CARDIFF.**

ALSO MAKERS OF FEED HEATERS, SUCTION FILTERS, STERN TUBE GREASE PUMPS, RUDDER BUFFERS, FAIRLEADS, AUXILIARY CONDENSERS, PUMPS, ETC.

# The Staffordshire Tube Co., Ltd.,
## BIRMINGHAM.

# Buyers' Guide.

LIST OF THE LEADING MAKERS OF SHIPBUILDING & SHIPYARD & DOCK MACHINERY, APPLIANCES, PLANT & STORES.

**ACCOMMODATION LADDERS—**
Linkleter's Patent Ship Fittings Co., Hudson St., North Shields.

**ACETYLENE —**
Carbic Ltd., 51, Holborn Viaduct, London, E.C.

**AERIAL ROPEWAYS—**
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

**AIR COMPRESSORS—**
Belliss & Morcom, Ltd., Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, S.E.

**AIR PUMPS—**
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Belliss & Morcom, Ltd., Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Dawson & Downie, Elgin Works, Clydebank.
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Weir, G. & J., Ltd., Cathcart, Glasgow.

**ALUMINIUM GOODS—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

**ALUMINIUM PAINT—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

**ANCHORS—**
Byers, W. L., & Co., Ltd., Tavistock House, [Sunderland.
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs. [on-Tyne.
Spencer, John, & Sons, Ltd., Steel Works, Newburn-
Sykes, Richard, & Son, Ltd., Cradley Heath.
Taylor, Samuel, & Sons (Brierley Hill), Ltd., Brierley Hill, Staffs.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

**ANTI-CORROSIVE COMPOSITIONS—**
Briggs, W., & Sons, Ltd., Dundee.
Hamilton, Archd., & Co., Possilpark, Glasgow.
Holzapfels, Ltd., Newcastle-on-Tyne.
Hoyle, Robson, Barnett & Co., Ltd., St. Nicholas Chambers, Newcastle-on-Tyne.
Milburn, A., & Co., Sunderland.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.

**ANTI-FOULING COMPOSITION—**
Holzapfels, Ltd., Newcastle-on-Tyne.
Hoyle, Robson, Barnett, & Co., Ltd., St. Nicholas Chambers, Newcastle-on-Tyne.
Websters Ltd., Hull.

**ANTI-FRICTION METALS—**
Billington & Newton, Ltd., Longport, Staffs.
Bowran, Robt., & Co., Ltd., Newcastle-on-Tyne.
Delta Metal Co., Ltd., East Greenwich.
McConwell, A., & Co., Ltd., 60, Drury Buildings, Water Street, Liverpool.

**ARMOUR PLATES—**
Brown, John, & Co., Ltd., Atlas Works, Sheffield.

**ASBESTOS FITTINGS—**
McRobie, John, & Sons, 94, Elliott Street, Glasgow.

**ASBESTOS GOODS—**
Beldam Packing & Rubber Co., Ltd., 1 and 2, Gracechurch Street, London, E.C.
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

**ASH BAGS—**
Speedings Ltd., Sail Works, Sunderland.

**ASH BINS—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Hingley & Lamb, Ltd., Stour Works, Lye, Worcs.

**ASH DISCHARGING APPLIANCES—**
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.
Trewent & Proctor, F. J., Ltd., 43, Billiter Buildings, E.C.

**AWNINGS—**
Speedings Ltd., Sail Works, Sunderland.

**BARROWS—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

**BARROWS (Cargo)—**
Edina Manufacturing Co., 19h, Broad Wynd, Leith.

**BEDDING & NAPERY—**
Stewart, Archibald & Co., 40-48, Union Street, [Glasgow.

**BEMAL CONDENSER TUBES—**
Yorkshire Copper Works, Ltd., Leeds.

**"BITUMASTIC" ENAMEL MANUFACTURERS—**
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.

**BLINDS—**
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

**BLOCKS—**
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
Higginson & Co., 7, Hurst Street, Liverpool.

**BLOWERS—**
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. [Belfast.
Davidson & Co., Ltd., Sirocco Engineering Works,
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

**BOATS—**
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.

**BOILERS—**
Central Marine Engine Works, West Hartlepool.
Elliot & Jeffery, East Dock, Cardiff.
Harris Bros., Ltd., Cambrian Dry Docks, Swansea.
Hawthorn, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Howden, James, & Co., Ltd., Scotland St., Glasgow.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., East Cowes, I.W.

**BOILER CIRCULATORS—**
Beresford Eng'n'ring Co., Beresford Lane, Cardiff.

**BOILER CLEANER —**
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

**BOILER COMPOSITION—**
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

**BOILER COVERING—**
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

**BOILER MOUNTINGS—**
Cockburns Ltd., Cardonald, Nr Glasgow.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

**BOILER PLATES (Steel)—**
Leeds Forge Co., Ltd., Leeds.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

**BOILER PRESERVATIVE—**
Atlas Preservative Co., Ltd., Deptford, S.E.

**BOILER TUBES—**
Yorkshire Copper Works, Ltd., Leeds.

**BOLTS AND NUTS—**
Coventry Chain Co., Ltd., Coventry.

**BORING MACHINES—**
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.
Greenwood & Batley, Ltd., Albion Works, Leeds.

**BRASS & COPPER FITTINGS—**
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

**BRASS & COPPER RODS—**
Delta Metal Co., Delta Works, East Greenwich,

**BRASS FOUNDERS—**
Billington & Newton, Ltd., Longport, Staffs.
Chambers, John, Ltd., Lowestoft.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow. [Street, Glasgow.
McGeoch, Wm., & Co., Ltd., 28, West Campbell
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
Williams, Wm., Alexandra Brass Foundry, Cardiff.

**BRASS NAME-PLATES—**
Metograph Co., 280, Cathedral Street, Glasgow.
Rennie & Co., North Greenhill Road, Paisley.

**BRASS TUBES—**
Yorkshire Copper Works, Ltd., Leeds.

**BRASSWORK—**
Laycock, W. S., Ltd., Victoria Works, Millhouses,

**BRONZE (Manganese)—**
Billington & Newton, Ltd., Longport, Staffs.
Bowran, Robt., & Co., Ltd., 4, St. Nicholas Buildings, Newcastle-on-Tyne.
Callender's Cable & Construction Co., Ltd., Belvedere, Kent.
Delta Metal Co., Ltd., E. Greenwich, London, S.E.
Stone, J., & Co., Ltd., Deptford, London, S.E.

**BRIGHT STEEL—**
Stonehouse Works Co., Ltd., Houghton Street, West Bromwich.

**BUCKETS—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Hingley & Lamb, Ltd., Stour Works, Lye, Worcs.

**BULKHEADS (Patent)—**
Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.

**BUNTING—**
Riley, Edward, & Co., Leeds.

**BUOYANT DECK SEATS—**
Crichton, C. & H., Ltd., Huskisson Engine Works, [Liverpool.
Linkleter's Patent Ship Fittings Co., Hudson

**BUOYS—**
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool. Street, North Shields.
Hingley & Sons, Ltd., Netherton Iron Works,

**CABINET MAKERS—**
Stewart, Archibald & Co., 40-48, Union Street, Dudley, Staffs.

**CABLES (Chains)—**
Byers, W. L., & Co., Ltd., Tavistock House, Sunderland. Glasgow.
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.
Sykes, Richard, & Son, Ltd., Cradley Heath.
Taylor, Samuel, & Sons (Brierley Hill), Ltd., Brierley Hill, Staffs.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

**CAISSONS & DOCK GATES—**
Swan, Hunter, & Wigham Richardson, Ltd.,

**CALORIFIERS—**
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow. Wallsend-on-Tyne.
Royles Ltd., Irlam, Nr. Manchester.

**CAPSTANS (Electric)—**
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.
Stothert & Pitt, Ltd., Bath.

**CARGO BLOCKS—**
Higginson & Co., 7, Hurst Street, Liverpool.

**CARPETS—**
Stewart, Archibald & Co., 40-48, Union St., Glasgow.

**CASE HARDENING BOXES—**
Else, John, & Son, Ltd., 48, Muntz St., Birmingham

**CASE HARDENING COMPOSITION—**
Else, John, & Son, Ltd., 48, Muntz St., Birmingham

**CASE HARDENING OIL—**
Else, John, & Son, Ltd., 48, Muntz St., Birmingham

**CAST BRASS PLATES—**
Brown, Robert, & Co., 12, Espedair St., Paisley.

**CASTINGS (Steel)—**
Brown, John, & Co., Atlas Works, Sheffield, and Clydebank, Nr. Glasgow.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyd's, Ltd., 41, Oswald St., Glasgow.

**CASTINGS (Steel, Iron and Brass) -**
Chambers, John, Ltd., Lowestoft.
Darlington Forge Co., Ltd., Darlington.
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.
McRobie, John, & Sons, 94, Elliott Street,

**CEMENT—**
Aberthaw & Bristol Channel Portland Cement Co., Ltd., Merthyr House, Cardiff. Cranstonhill, Glasgow.

**CHAINS—**
"Coventry" Chain Co., Ltd., Spon End Works, Coventry.

**COAL—**
Beynon, T., & Co., Ltd., Merthyr House, Cardiff.
Britannic Merthyr Coal Co., Ltd., Cambrian Bldgs., Cardiff.
Cambrian Collieries, Ltd., Cambrian Bldgs., Cardiff.
Davis, D., & Sons, Ltd., Cymric Bldgs., Cardiff.
Ebbw Vale Steel, Iron & Coal Co., Ltd., Merthyr House, Cardiff.
Fernhill Collieries, Ltd., Merthyr House, Cardiff.
Glamorgan Coal Co., Ltd., Cambrian Bldgs., Cardiff.
Harrisons (London), Ltd., 66, Mark Lane, E.C.
Naval Colliery Co. (1897), Ltd., Cambrian Bldgs., Cardiff.
Newport Abercarn Black Vein Steam Coal Co., Ltd., Merthyr House, Cardiff.
Powell Duffryn Steam Coal Co., Ltd., Cardiff.
Rhymney Iron Co., Ltd., Merthyr House, Docks,

**COMPASSES (Ship)—**
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs. Cardiff.

**CONDENSERS—**
Bellis & Morcom, Ltd., Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Dawson & Downie, Elgin Works, Clydebank.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Royles, Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

**CONDENSER TUBES (Brass and Copper)—**
Yorkshire Copper Works, Ltd., Leeds.

**CONTROLLERS & CONTROL GEAR—**
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

**CONVEYORS—**
Mather & Platt, Ltd., Manchester.

**COOKING APPARATUS—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Grieve, T., & Sons, Bedford Street, North Shields.

**COPPER PIPES—**
Yorkshire Copper Works, Ltd., Leeds.

**COPPERSMITHS—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Chambers, John, Ltd., Lowestoft.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

**COPPER TUBES—**
Yorkshire Copper Works, Ltd., Leeds.

**CORK INSULATION—**
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W. [Newcastle-on-Tyne.
Newalls Insulation Co., 31, Mosley Street,

**CORRUGATED IRON—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

**COUNTER (Engine)—**
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.

**CRAB WINCHES—**
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

**CRANES—**
Ransomes & Rapier, Ltd., 32, Victoria St., S.W.
Stothert & Pitt, Ltd., Bath.

**CYLINDERS (Copper)—**
Yorkshire Copper Works, Ltd., Leeds.

**DELTA METAL—**
Delta Metal Co., Delta Works, East Greenwich, S.E.

**DERRICKS & DAVITS—**
Howden, James, & Co., Ltd., 95, Scotland Street, Glasgow.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

**DISTILLING APPARATUS—**
Royles Ltd., Irlam, Nr. Manchester.

**DIVING APPARATUS—**
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, S.E.
Mining Engineering Co., Ltd., Meco Works, Moorfields, Sheffield.

**DOCK & SHIP LIGHTING—**
Carbic Ltd., 51, Holborn Viaduct, London, E.C.

**DOCK GATES—**
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. Glasgow.
Hamilton, Wm., & Co., Ltd., Port Glasgow, Scotland.
Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.

**DOORS (Watertight)—**
British Thomson-Houston Co., Ltd., Rugby.
Stone, J., & Co., Ltd., Deptford, S.E.

## BUYERS' GUIDE—*continued.*

**DREDGE PLANTS**
[illegible]

**DREDGING**
[illegible]

**DRILLING MACHINES**
[illegible]

**DRILLS—**
[illegible]

**DRILLS (Pneumatic and Electric)—**
[illegible]

**DRY FITTINGS (Laundry)—**
Bradford, T., & Co., Salford, Manchester.

**DYNAMOS—**
[illegible]
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.

**ELECTRIC CRANES—**
[illegible]

**ELECTRIC DERRICKS—**
[illegible]
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.

**ELECTRIC DYNAMOS & MOTORS—**
Boothroyd, H. T., Ltd., Bootle, Liverpool.
[illegible]
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester. on-Tyne.
[illegible] Sunderland.

**ELECTRIC FITTINGS—**
Durham, Churchill & Co., Grimesthorpe, Sheffield.

**ELECTRIC HEATING & COOKING APPARATUS—**
British Thomson-Houston Co., Ltd., Rugby.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

**ELECTRIC LAMPS—**
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Machester.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

**ELECTRIC LIGHTING—**
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

**ELECTRIC-LIGHTING PLANT—**
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt. Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

**ELECTRIC MOTORS—**
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

**ELECTRIC WIRES—**
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.

**ELECTRICAL CONTRACTORS—**
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
[illegible] Merkland Street, Partick, Glasgow. [Glasgow.
Martin, W. C., & Co., 10, West Campbell Street,
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

**ELECTRICAL ENGINEERS—**
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Graham, Alfred, St. Andrew's Works, Crofton Park Road, S.E.
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt. Ltd., Manchester. on-Tyne.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

**ELECTRICAL INSTRUMENTS (Ammeters)**
British Thomson-Houston Co., Ltd., Rugby.
[illegible]
Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-

**ELECTRICAL INSTRUMENTS (Circuit Breakers)**
[illegible]
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A. & Co., Ltd., Hebburn-on-Tyne.

**ELECTRICAL INSTRUMENTS (Relays)—**
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

**ELECTRICAL INSTRUMENTS (Voltmeters)—**
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-

**EMERY WHEELS—**
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow.

**ENAMEL MANUFACTURERS—**
Holzapfels, Ltd., Newcastle-on-Tyne.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.

**ENGINE (Electric Light)—**
Belliss & Morcom, Ltd., Birmingham.
Greenwood & Batley, Ltd., Albion Works, Leeds.

**ENGINES (Land)—**
Chambers, John, Ltd., Lowestoft.

**ENGINES (Marine)—**
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Central Marine Engine Works, West Hartlepool.
Chambers, John, Ltd., Lowestoft.
Hawthorn, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Howden, James, & Co., Ltd., Scotland St., Glasgow.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

**ENGINE & DECK STORES—**
McGeoch, Wm. & Co., Ltd., 28, West Campbell Street, Glasgow.
Metallic Valve Co., Colonial House, Water Street, Liverpool.

**ENGINE AUXILIARIES—**
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.

**ENGINE FITTINGS—**
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

**ENGINE-ROOM OUTFITS—**
Grieve, T., & Sons, Bedford Street, North Shields.
Newalls Insulation Co., 31, Mosley Street,

**ENGRAVERS—** Newcastle-on-Tyne.
Brown, Robert, & Co., 12, Espedair St., Paisley.

**EVAPORATORS—**
Central Marine Engine Works, West Hartlepool.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Royles, Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

**EXTRUDED METALS (Brass, Bronze, Copper, Delta Metals)—**
Delta Metal Co., Ltd., E. Greenwich, London, S.E.

**FANS—**
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow.
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg., Co., Ltd., Trafford Park, Manchester. [Belfast.
Davidson & Co., Ltd., Sirocco Engineering Works,
Hogan & Wardrop, 2, Gresham Buildings, Basinghall Street, London, E.C.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

**FEED-WATER HEATERS—**
Beresford Eng'n'ring Co., Beresford Lane, Cardiff.
Central Marine Engine Works, West Hartlepool.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Royles, Ltd., Irlam, Nr. Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

**FILES—**
Brown, John, & Co., Atlas Works, Sheffield.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

**FILTERS (Marine)—**
Central Marine Engine Works, West Hartlepool.
Chambers, John, Ltd., Lowestoft.
Cockburns, Ltd., Cardonald, Nr. Glasgow.
Mather & Platt, Ltd., Manchester.

**FIREBARS—**
Liverpool Patents Co., Ltd., Derby Square, James Street, Liverpool.

**FIRE EXTINGUISHERS—**
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Mather & Platt, Ltd., Manchester.

**FIRE-FIGHTING APPLIANCES—**
Mining Engineering Co., Ltd., Meco Works, Sheffield.

**FLAGS**
Riley, Edward, & Co., Leeds.
Speedings, Ltd., Sail Works, Sunderland.

**FLOATING DOCKS—**
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. Glasgow. [Scotland.
Hamilton, Wm., & Co., Ltd., Port Glasgow,
Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.

**FLOOR COVERING—**
Docker Bros., Ltd., Metropolitan Road, Saltley, Birmingham.

**FORCED DRAUGHT—**
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow. [Belfast.
Davidson & Co., Ltd., Sirocco Engineering Works,
Howden, J., & Co., Ltd., Scotland Street, Glasgow.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

**FORGING PRESSES—**
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.

**FORGINGS—**
Brown, John & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Hingley & Sons, Ltd., Netherton Iron Works, Staffs.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

**FORGINGS (Bronze)—**
Delta Metal Co., Delta Works, East Greenwich, London, S.E.

**FORGINGS (Steel)—**
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

**FUMIGATORS—**
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

**FURNACE BRIDGES—**
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.
McConnell, A., & Co., Ltd., 60, Drury Buildings, Water Street, Liverpool.

**FURNACES—**
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Deighton's Patent Flue & Tube Co., Ltd., Vulcan Works, Pepper Road, Leeds.
Leeds Forge Co., Ltd., Leeds.
Piggott, T., & Co., Ltd., Birmingham.

**FUSES—**
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

**GALLEY GEAR—**
Grieve, T., & Sons, Bedford Street, North Shields.

**GALVANIZERS—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

**GAS ENGINES—**
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Mather & Platt, Ltd., Manchester.

**GAUGES—**
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

**GEAR CUTTING—**
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

**GEARING—**
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds

**GEARS—**
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

**GEARS (Noiseless or Silent)—**
British Thomson-Houston Co., Ltd., Rugby.
Brown, David, & Sons (Hfd.), Ltd., Huddersfield.

**GOVERNORS—**
Aspinall's Patent Governor Co., 7, Strand Street,

**GRINDING MACHINES—** Liverpool.
Greenwood & Batley, Ltd., Albion Works, Leeds.

**GRINDING WHEEL MACHINES—**
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow

**HATCH COVERS (Patent)—**
Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.

**HEATING APPARATUS—**
Ashwell & Nesbit, Ltd., Barkby Lane, Leicester.
Royles, Ltd., Irlam, Nr. Manchester.
Saunders & Taylor, Ltd., 43, Lower Mosley Street, Manchester.

**HEATING ENGINEERS—**
Ashwell & Nesbit, Ltd., Barkby Lane, Leicester.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles, Ltd., Irlam, Nr. Manchester.
Saunders & Taylor, Ltd., 43, Lower Mosley Street, Manchester.

**HELM SIGNAL TELEMOTORS—**
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.

**HIGH SPEED DRILLS—**
Brown, John, & Co., Atlas Works, Sheffield.

**HIGH SPEED STEEL—**
Brown, John, & Co., Atlas Works, Sheffield.

**HOISTS—**
Mather & Platt, Ltd., Manchester.
Stothert & Pitt, Ltd., Bath.
Waygood-Otis, Ltd., Falmouth Road, S.E.

# BUYERS' GUIDE—*continued.*

**HOSE—**
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

**HYDRAULIC CRANES—**
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

**HYDRAULIC MACHINERY—**
Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Waygood-Otis, Ltd., Falmouth Road, S.E.

**HYDRANTS—**
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

**INDIARUBBER—**
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London S.E.

**INDICATORS—**
Robinson, A., & Co., Ltd., Bootle, Liverpool.

**INDUCED DRAUGHT—**
Davidson & Co., Ld., Sirocco Eng'n'g W'rks, Belfast
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

**INSULATIONS—**
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W. [Liverpool.
Liverpool Refrigeration Co., Ltd., Colonial House,

**IRON ROOFS AND BUILDINGS—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

**JOINTING MATERIAL (Manganesite)—**
Hudson & Co.'s Successors, John, 15, Victoria Warehouses, Mansell Street, E.C.

**LAMPS AND LIGHTS—**
Grieve, T., & Sons, Bedford Street, North Shields.
Kaye, Joseph, & Sons, Ltd., Leeds.

**LAUNCHES—**
Chambers, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Livingstone & Cooper, Ltd., Hessle, Hull.
MacLaren Bros., Ltd., Dumbarton.
Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Seamless Steel Boat Co., Ltd., Wakefield.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, London, S.W.
Watson, J. S., Gainsborough.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

**LAUNDRY MACHINERY—**
Bradford, T., & Co., Salford, Manchester.

**LAVATORY FITTINGS AND APPLIANCES—**
Levick, John, Alma Street, Aston, Birmingham.

**LEAD (Sheets and Pipes)—**
Rimer Bros., Newcastle-on-Tyne.

**LEAD (White and Red)—**
Rimer Bros., Newcastle-on-Tyne.

**LIFEBELTS AND BUOYS—**
Speedings Ltd., Sail Works, Sunderland.

**LIFTS (Window)—**
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

**LIFTS AND HOISTS—**
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh
Waygood-Otis, Ltd., Falmouth Road, S.E.

**LIGHTERAGE—**
Alexander, W. H. J., St. John's Wharf, Wapping, E.

**LIGHTERS—**
Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. Glasgow.
Crichton, J., & Co., Saltney Shipyard, Chester.
Watson, J. S., Gainsborough.

**LIMEWASHING & DISINFECTING MACHINES—**
Stonehouse Work Co., Ltd., Houghton Street, West Bromwich.

**LOCKS—**
Kaye, Joseph, & Sons, Ltd., Leeds.

**LOCOMOTIVE TUBES (Copper & Brass)—**
Yorkshire Copper Works, Ltd., Leeds.

**LUBRICATORS—** [Cranstonhill, Glasgow.
McRobie, John, & Sons, 94, Elliott Street,

**MACHINE TOOLS—**
Campbells & Hunter, Ld., Dolphin Foundry, Leeds.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Scriven & Co., Leeds Old Foundry, Leeds.

**MACHINERY NAME PLATES—**
Brown, Robert, & Co., 12, Espedair St., Paisley.

**MAGNESIA—**
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

**MARINE ENGINEERS—**
Bailey, C. H., Newport, Mon. Barry Docks.
Barry Graving Dock & Engineering Co., Ltd., Brown, John, & Co., Ltd., Clydebank, Nr. Glasgow.
Chambers, John, Ltd., Lowestoft.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool. [Southampton.
Day, Summers & Co., Ltd., Northam Ironworks,
Delegación de la Compañia Trasatlantica, Cadiz.
Diamond, Thos., & Co., Cardiff.
Doxford, Wm., & Sons, Ltd., Sunderland.
Elliott & Jeffery, East Dock, Cardiff.
Gray, Wm., & Co., Ltd., West Hartlepool.
Harland & Wolff, Ltd., Belfast.
Harris Bros., Ltd., Cambrian Dry Docks, Swansea.
Hawthorn, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
Hill's Dry Docks & Engineering Co., Ltd., Cardiff.

**MARINE ENGINEERS** *(contd.)*—
Livingstone & Cooper, Ltd., Hessle, Hull.
Mountstuart Dry Docks, Ltd., Cardiff.
Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Richardsons, Westgarth & Co., Ltd., Hartlepool, Middlesbrough and Sunderland.
Shearman, John, & Co., Ltd., Cardiff.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Scotland.
Stephen, Alex., & Sons, Ltd., Linthouse, Govan, Glasgow.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne. [Westminster, S.W.
Thornycroft, John I., & Co., Ltd, Caxton House,
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd, East Cowes, I.W.
Workman Clark & Co., Ltd., Belfast.
Yarrow & Co., Ltd., Glasgow.

**MARINE GOVERNORS—**
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.

**MARKING-OFF TABLES—**
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

**MATTRESSES—**
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

**METALLIC PACKING—**
Beldam Packing & Rubber Co., Ltd., 1 and 2, Gracechurch Street, London, E.C.
McConwell, A., & Co., Ltd., 60, Drury Buildings, Water Street, Liverpool.
United States Metallic Packing Co., Ltd., Bradford

**METAL SPINNINGS—**
Levick, John, Alma Street Aston, Birmingham.

**METALS (Patent)—**
Bowran, Robt., & Co., Ltd., Newcastle-on-Tyne.
Delta Metal Co., Ltd., Delta Works, East Greenwich.

**MOTOR BOATS—**
Chambers, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Livingstone & Cooper, Ltd., Hessle, Hull.
MacLaren Bros., Ltd., Dumbarton.
Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Seamless Steel Boat Co., Ltd., Wakefield.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, London, S.W.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

**MOTOR STARTING AND CONTROL GEAR—** [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

**NAVAL ARCHITECTS' SUPPLIES—**
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

**OIL CANS—**
Kaye, Joseph, & Sons, Ltd., Leeds.

**OIL ECONOMISERS—**
Kaye, Joseph, & Sons, Ltd., Leeds.

**OIL ENGINES—**
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Edina Manufacturing Co., 19b, Broad Wynd, Leith.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, S.W.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

**OIL-FUEL INSTALLATION—**
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

**OIL IMPORTERS & BLENDERS—**
Rimer Bros., Newcastle-on-Tyne.

**PACKING (Engine)—**
Beldam Packing & Rubber Co., Ltd., 1 and 2, Gracechurch Street, London, E.C.
Walker, Jas., & Co., Ltd., Lion Works, Garford Street, West India Dock Road, E.

**PAINTS—**
Briggs, W., & Sons, Ltd., Dundee.
Cocks, Harry, & Co., Cardiff.
Hamilton, Archd., & Co., Possilpark, Glasgow.
Hoyle, Robson, Barnett, & Co., Ltd., St. Nicholas Chambers, Newcastle-on-Tyne.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.
Websters Ltd., Hull.

**PANELLING—**
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

**PATENT HAWSE PIPE AND DECK FLANGE—**
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.

**PERFORATED METALS—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Piggott, T., & Co., Ltd., Birmingham.

**PIPES—**
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
Yorkshire Copper Works, Ltd., Leeds.

**PLANING MACHINES for Plate Edges—**
Scriven & Co., Leeds Old Foundry, Leeds.

**PLATE BENDING ROLLS—**
Scriven & Co., Leeds Old Foundry, Leeds.

**PORCELAIN ENAMELLED CAST IRON—**
Levick, John, Alma Street, Aston, Birmingham.

**PROPELLERS—**
Billington & Newton, Ltd., Longport, Staffs.
Chambers, John, Ltd., Lowestoft. [Liverpool.
Crichton, C. & H., Ltd., Huskisson Engine Works.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

**PROPELLER BLADES—**
Billington & Newton, Ltd., Longport, Staffs.
Darlington Forge Co., Ltd., Darlington.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

**PUBLICATIONS—**
"Shipbuilding and Shipping Record," Queen Anne's Chambers, Westminster, London, S.W.

**PULLEY BLOCKS—**
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.
Higginson & Co., 7, Hurst Street, Liverpool.
Loveridge, Ltd., Cardiff.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

**PUMPS—**
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Beresford Eng'n'ring Co., Beresford Lane, Cardiff.
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Central Marine Engine Works, West Hartlepool.
Davey & Co. (London), Ltd., 88, West India Dock Road, E.
Dawson & Downie, Elgin Works, Clydebank.
Edina Manufacturing Co., 19b, Broad Wynd, Leith.
Hall, J. P., & Sons, Ltd., Peterborough.
Mather & Platt, Ltd., Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

**PUNCHING AND SHEARING MACHINES—**
Scriven & Co., Leeds Old Foundry, Leeds.

**RADIATORS—**
British Thomson-Houston, Co., Ltd., Rugby.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

**RADIATOR TUBES—**
Yorkshire Copper Works, Ltd., Leeds.

**REAMERS—**
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

**REFRIGERATING MACHINERY—**
Hall, J. & E., Ltd, Dartford Ironworks, Kent.
Liverpool Refrigeration Co., Ltd., Colonial House, Liverpool.
Sterne, L. & Co., Ltd., Crown Ironworks, Glasgow.

**RESCUE APPLIANCES—**
Mining Engineering Co., Ltd., Meco Works, Moorfields, Sheffield.

**REVERSING ENGINES (Direct-Acting Type)—** [Works, Edinburgh.
Brown Brothers & Co., Ltd., Rosebank Iron
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh

**RHEOSTATS & RESISTANCES (all kinds)—**
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A. & Co., Ltd., Hebburn-on-Tyne.

**ROPE-CUTTING MACHINES—**
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

**ROPES (Wire)—**
Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

**ROUND AND OVAL HOLE CUTTING-OUT MACHINES—**
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

**RUBBER GOODS—**
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

**RUBBER HOSE—**
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

**RUSTLESS IRON—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

**SAFE MANUFACTURERS—**
Whitfield's Safe & Door Co., Oxford Street, Birmingham.

**SALOON LIGHTS—**
Callender's Cable & Construction Co., Ltd., Belvedere, Kent.
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

**SALVAGE—**
Alexander, W. H. J., St. John's Wharf, Wapping, E.

**SANITARY FITTINGS AND APPLIANCES—**
Levick, John, Alma Street, Aston, Birmingham.

**SCREWING MACHINES—**
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

**SHAFTING—**
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

**SHAPING MACHINES—**
Greenwood & Batley, Ltd., Albion Works, Leeds.

**SHEAVES—**
Higginson & Co., 7, Hurst Street, Liverpool.

**SHEERS, TRAVERSING (Land and Floating)—**
Day, Summers & Co., Ltd., Northam Ironworks, Southampton.

**SHIP APPLIANCES—**
Linkleter's Patent Ship Fittings Co., 20, Percy Street, Tynemouth.

**SHIP BROKERS—**
Walford, Leopold (London) Ltd., 29, Gt. St. Helens, E.C.

**SHIP BROKERS (Sale and Purchase)—**
Hall, Edward, Cardiff.
Pinkney, Thos., & Sons, Sunderland.
Walford, Leopold (London) Ltd., 29, Gt. St. Helens, E.C.

## BUYERS' GUIDE—*continued.*

**SHIPBUILDERS -**
[illegible]
Hawthorn, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.
Isherwood, J. W., 4, Lloyd's Avenue, London, E.C.
Livingstone & Cooper, Ltd., Hessle, Hull.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Scotland.
Stephen, Alex., & Sons, Ltd., Linthouse, Govan, Glasgow.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne. [Westminster, S.W.
Thornycroft, John I., & Co., Ltd., Caxton House, Watson, J. S., Gainsborough.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Workman Clark & Co., Ltd., Belfast.
Yarrow & Co., Ltd., Glasgow.

**SHIP CONSTRUCTION—**
Brown, John, & Co., Ltd., Clydebank, Nr. Glasgow.
Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.
Isherwood, J. W., 4, Lloyd's Avenue, London, E.C.
Simons, Wm., & Co., Ltd., Renfrew, Nr. Scotland.
Swan, Hunter, & Wigham Richardson, Ltd., and Maxwell Ballard, Wallsend Shipyard, Wallsend-on-Tyne.

**SHIP FURNISHINGS & FITTINGS—**
Cocks, Harry, & Co., Cardiff.
Davey & Co. (London), Ltd., 88, West India Dock Road, E.
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield. [Street, North Shields.
Linkleter's Patent Ship Fittings Co., Hudson
Loveridge, Ltd., Cardiff.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow. [Liverpool.
Metallic Valve Co., Colonial House, Water Street,
Stewart, Archibald, & Co., 40-48, Union Street, Glasgow.
Waygood-Otis, Ltd., Falmouth Road, S.E.

**SHIP LAVATORIES—**
Stewart, Archibald, & Co., 40-48, Union St., Glasgow

**SHIP PLATES (Steel)—**
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

**SHIP REPAIRERS—**
Bailey, C. H., Newport, Mon.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool. [Southampton.
Day, Summers & Co., Ltd., Northam Ironworks,
Diamond, Thos., & Co., Cardiff.
Doxford, Wm., & Sons, Ltd., Sunderland.
Elliott & Jeffery, East Dock, Cardiff.
Gray, Wm., & Co., Ltd., West Hartlepool.
Grayson, H. & S., Ltd., Royal Liver Building, Harland & Wolff, Ltd., Belfast. Liverpool.
Harris Bros., Cambrian Dry Docks, Swansea.
Hawthorn, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
Hill's Dry Docks & Engineering Co., Ltd., Cardiff.
Mounstuart Dry Docks, Ltd., Cardiff.
Shearman, John, & Co., Ltd., Cardiff.
Stephen, Alex., & Sons, Ltd., Linthouse, Govan, Glasgow.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
Yarrow & Co., Ltd., Glasgow.

**SHIPS' ELECTRIC FITTINGS—**
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

**SHIPS' LAUNDRIES—**
Bradford, T., & Co., Salford, Manchester.

**SHIPS' TELEGRAPHS—**
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Robinson, A., & Co., Ltd., Bootle, Liverpool.

**SIGNAL FLASHING AND CABIN LAMPS—**
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

**SILICATE-COTTON SPECIALITIES—** [Glasgow.
Walker, Jas., & Co., 11, Bishop Court, Anderston,

**SKYLIGHT & LIFTING GEARS—**
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

**SLAG WOOL (Silicate Cotton)—**
Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

**SLEWING GEAR (for Ships' Derricks)—**
Edina Manufacturing Co., 19h, Broad Wynd, Leith.

**SMITHS' HEARTHS—**
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

**SOLDER—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

**SPEAKING TUBES—**
Durham, Churchill & Co., Grimesthorpe, Sheffield.

**SPELTER—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

**SPIRAL SPRINGS—**
Cockburns Ltd., Cardonald, Nr. Glasgow.
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow.

**SPONGES—**
[illegible], Ltd., Dingley Road, City Road, E.C.

**STAMPINGS—**
Dick, Main & Co., Ltd., East Greenwich.

**STAY BOLTS—**
Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.

**STEAM-FITTING MANUFACTURERS -**
Billingham & Newton, Ltd., Longport, Staffs.
Royle, Ltd., Irlam, Nr. Manchester.

**STEAM-HEATING—**
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

**STEAM KETTLES—**
Royles Ltd., Irlam, Nr. Manchester.

**STEAM PIPES—**
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
Yorkshire Copper Works, Ltd., Leeds.

**STEAM TRAPS—**
Cockburns Ltd., Cardonald, Nr. Glasgow.
Royles Ltd., Irlam, Nr. Manchester.

**STEAMSHIP SPECIALITIES—**
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield. [Liverpool.
Metallic Valve Co., Colonial House, Water House,

**STEEL—**
Brown, John, & Co., Atlas Works, Sheffield.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

**STEEL BARGES—**
Crichton, J., & Co., Saltney Shipyard, Chester.
Watson, J. S., Gainsborough.

**STEEL BOATS—**
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Renfrew, Scotland.
Seamless Steel Boat Co., Ltd., Wakefield.

**STEEL MAKERS—**
Brown, John, & Co., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

**STEEL PLATES AND SHEETS—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

**STEERING-GEAR—**
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Chambers, John, Ltd., Lowestoft.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Hastie, John, & Co., Ltd., Greenock.
Higginson & Co., 7, Hurst Street, Liverpool.

**STEERING GEAR (Buffers)—**
Loveridge, Ltd., Cardiff.

**STEERING TELEMOTORS—**
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Mactaggart, Scott & Co., Ld., Loanhead, Edinburgh.

**STOCKS AND DIES—**
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

**STORES (Ship)—**
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

**STRONG ROOM MANUFACTURERS—**
Whitfield's Safe & Door Co., Oxford St., Birmingham

**STRONG ROOM DOOR MANUFACTURERS—**
Whitfield's Safe & Door Co., Oxford St., Birmingham

**STRUCTURAL ENGINEERS—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

**SUPERHEATERS—**
Central Marine Engine Works, West Hartlepool.
Superheater Corporation, Ltd., Palace Chambers, 9, Bridge Street, Westminster, S.W.

**SUSPENSION BULB FURNACE—**
Leeds Forge Co., Ltd., Leeds.

**SWITCHBOARDS—**
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Holmes, J. H., & Co., Portland Road, Newcastle-
Mather & Platt, Ltd., Manchester. on-Tyne.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

**SWITCHGEAR & INSTRUMENTS -**
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester. [on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-
Reyrolle, A., & Co., Ltd., Hebburn-on-Tyne.

**SYRENS—**
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

**TANK TOP COVERING—**
Hamilton, Archd., & Co., Possilpark, Glasgow.
Wailes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.

**TANKS—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Mather & Platt, Ltd., Manchester.

**TARPAULINS—**
Speedings Ltd., Sail Works, Sunderland.

**TELEPHONES—**
Graham, Alfred, St. Andrew's Works, Crofton Park Road, S.E.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

**TIMEPIECES—**
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.

**TOOL STEEL—**
Brown, John, & Co., Atlas Works, Sheffield.

**TOWAGE**
Alexander, W. H. J., St. John's Wharf, Wapping, E.
Tilbury Contracting & Dredging Co., Ltd., Queen Anne's Chambers, Westminster, London, S.W.

**TUBE PLATE CUTTING-OUT MACHINES—**
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

**TUBES—**
Royles Ltd., Irlam, Nr. Manchester.
Staffordshire Tube Co., Ltd., Birmingham.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.
Yorkshire Copper Works, Ltd., Leeds.

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**TUBES & FITTINGS (Wrought Iron)—**
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Greenwood & Batley, Ltd., Albion Works, Leeds.
Mather & Platt, Ltd., Manchester.

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British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
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Gray, Wm., & Co., Ltd., West Hartlepool.
Harland & Wolff, Ltd., Belfast.
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Howden, James, & Co., Ltd., Scotland Street, Glasgow.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Thornycroft, J. I., & Co., Ltd., Caxton House, Westminster.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Workman, Clark & Co., Ltd., Belfast.
Yarrow & Co., Ltd., Glasgow.

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Royles Ltd., Irlam, Nr. Manchester.

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Higginson & Co., 7, Hurst Street, Liverpool.
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White, J. Samuel, & Co., Ltd., East Cowes, I.W.
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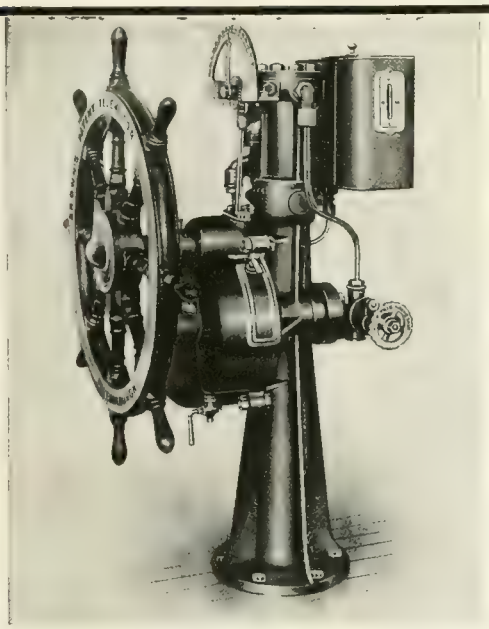
**ZINC—**
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.



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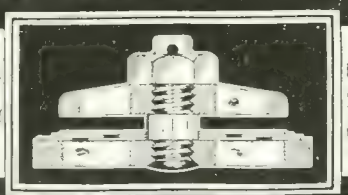

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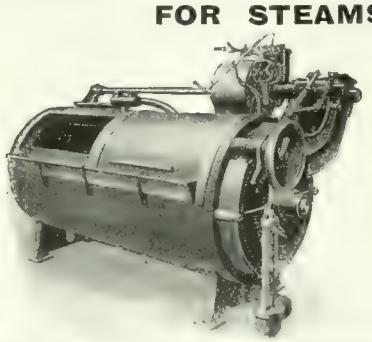

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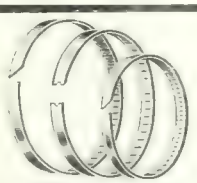

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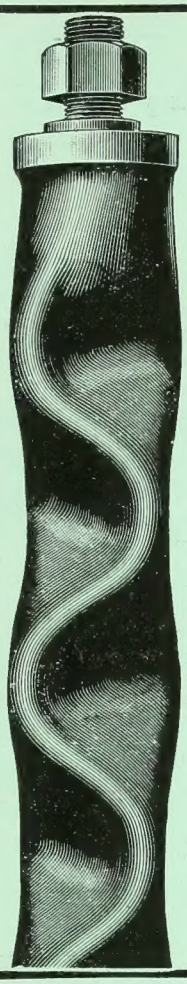

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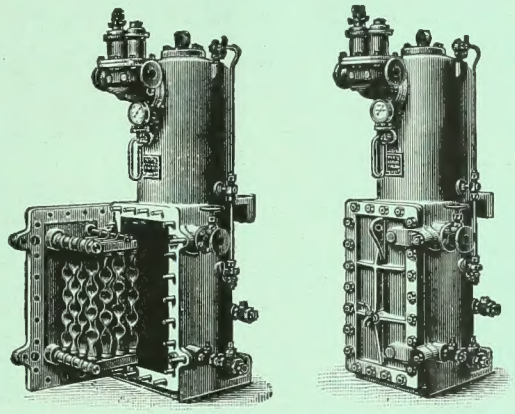

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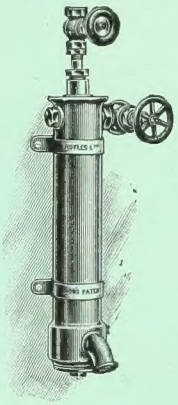

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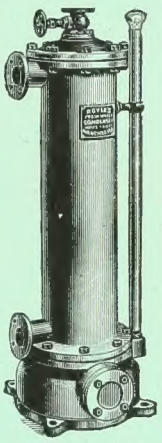

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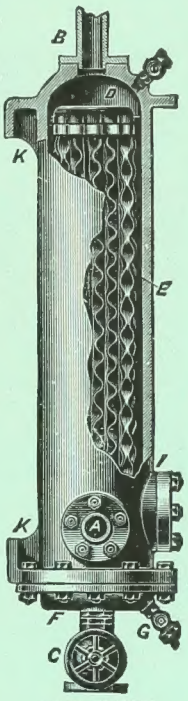


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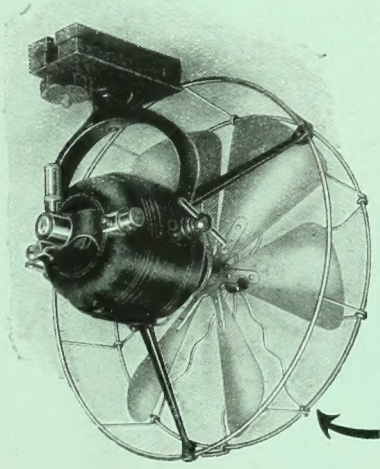

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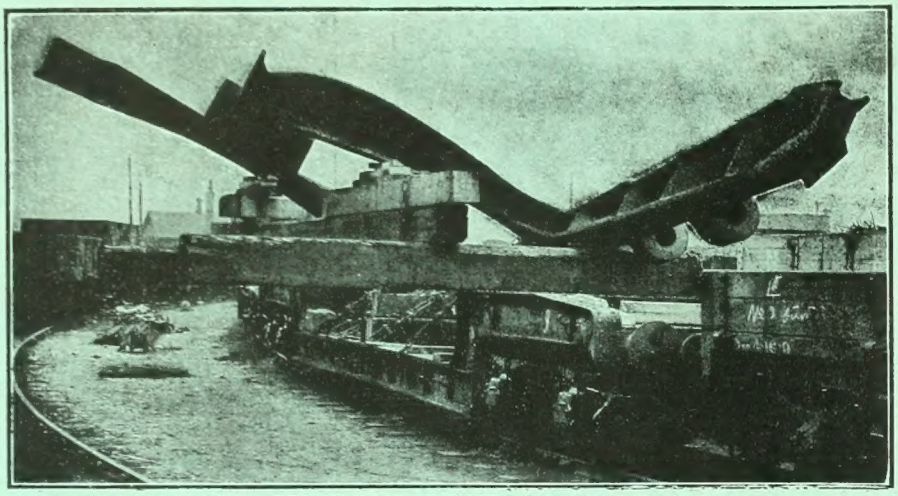
# STEEL AND IRON FORGINGS

**UP TO ANY WEIGHT.**



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